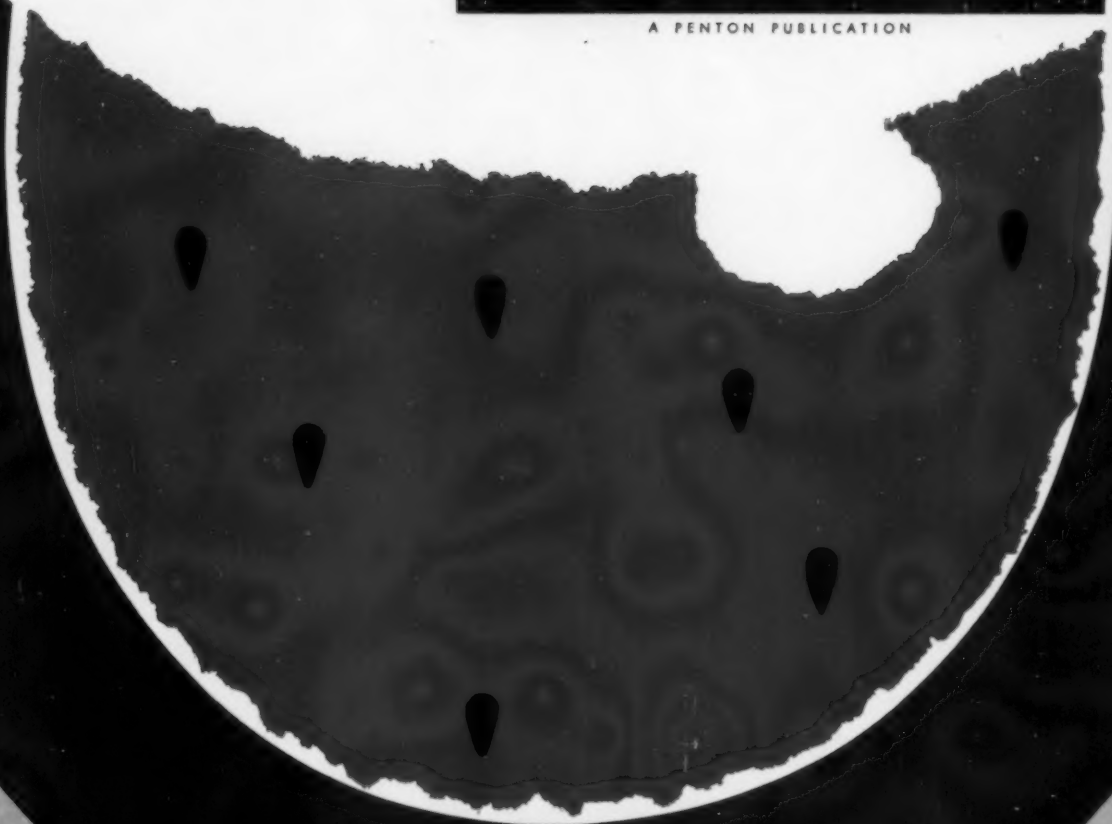
A PROGRAM FOR MANAGEMENT
1957 . . . No. 3

APRIL 15, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Profit Sharing . . . Spur for Productivity . . . page 115

✔ Are Ceramic Cutting Tools Ready? . . . page 126

✔ Semifinished Steel Exports Rise . . . page 179

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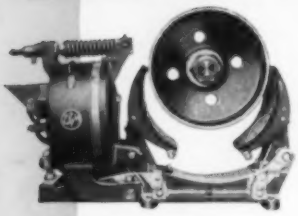
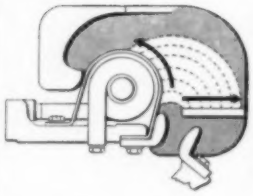
It's EC&M for a Complete Line of ELECTRIC CRANE CONTROL

BRAKES · DISCONNECT SWITCHES · CONTROLLERS · LIMIT STOPS

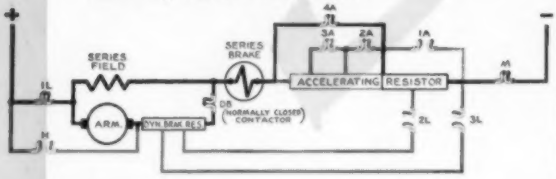


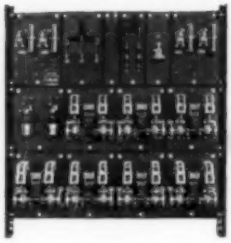
LONG-LIFE BRAKES for cranes operated by A.C. or D.C. power. High speed performance. Low upkeep.



CONTACTORS operate on the LINE-ARC principle. No destructive burning of arc shields. Cool contacts and reduced maintenance.

DYNAMIC LOWERING CIRCUITS for hoist motions. Respond quickly. Permit accurate inching for spotting loads.

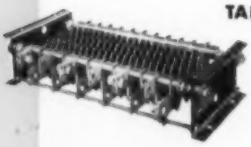




REVERSING-PLUGGING CONTROL for bridge and trolley motions. Automatically controlled acceleration. Only one simple relay for plugging.

YOUNGSTOWN SAFETY LIMIT STOPS protect against overhoisting accidents. Positive check against human errors.

CAM-TYPE MASTER SWITCHES have narrow width and short throw. Less operator fatigue.



TAB-WELD PLATE RESISTORS —spot-welding provides a continuous path, and keeps resistance value constant.

MANUAL-MAGNETIC DISCONNECT SWITCHES are very easy to operate. They are arranged to control crane lights, too.

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 · OHIO

7403

Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

Maker of Parts for TV Sets Gets Good Results with BTR

Here's a job where BTR (Bethlehem Tool Room) tool steel gets a good chance to show what it can do. The multiple-purpose die is used by Suckle Electronics Company, Camden, N. J., to pierce, notch, louver and form high-voltage shields for TV sets. The shields are made of 16-gage steel, and are turned out in a 95-ton press at the rate of more than 400 pieces per hour.

Engineers at Suckle Electronics report that they are well satisfied with BTR. They particularly like its safe-hardening property, toughness, and ability to wear and wear.

BTR is our general-purpose, manganese-chromium-tungsten grade of oil-hardening tool steel. It's a grade that is consistently racking up substantial shop savings for manufacturers in a wide range of applications. Your Bethlehem tool-steel distributor will be more than pleased to furnish complete information about BTR. Why not give him a phone call right now, while you have it in mind!

• • • • • • • • • •

CR-MO-W Gets the Okay

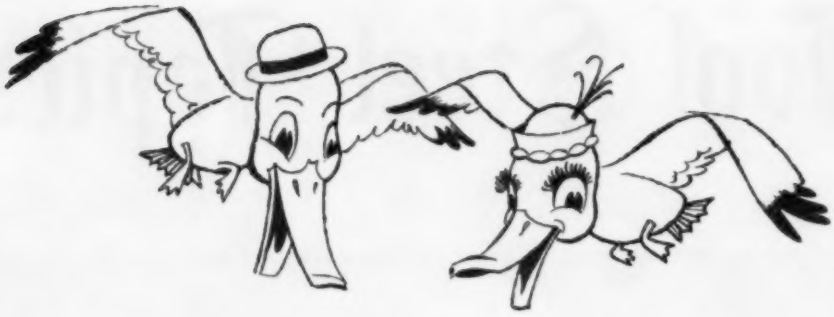
After being machined by the end mill, this hot-piercing punch, made of Bethlehem Cr-Mo-W (chrome-moly-tungsten) tool steel, gets final size check by micrometer. Cr-Mo-W, an excellent hot-work steel, contains 5 pct chromium. Because of its characteristics, it is perfectly at home on jobs that involve shock, drastic changes of temperature, and heat-checking.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

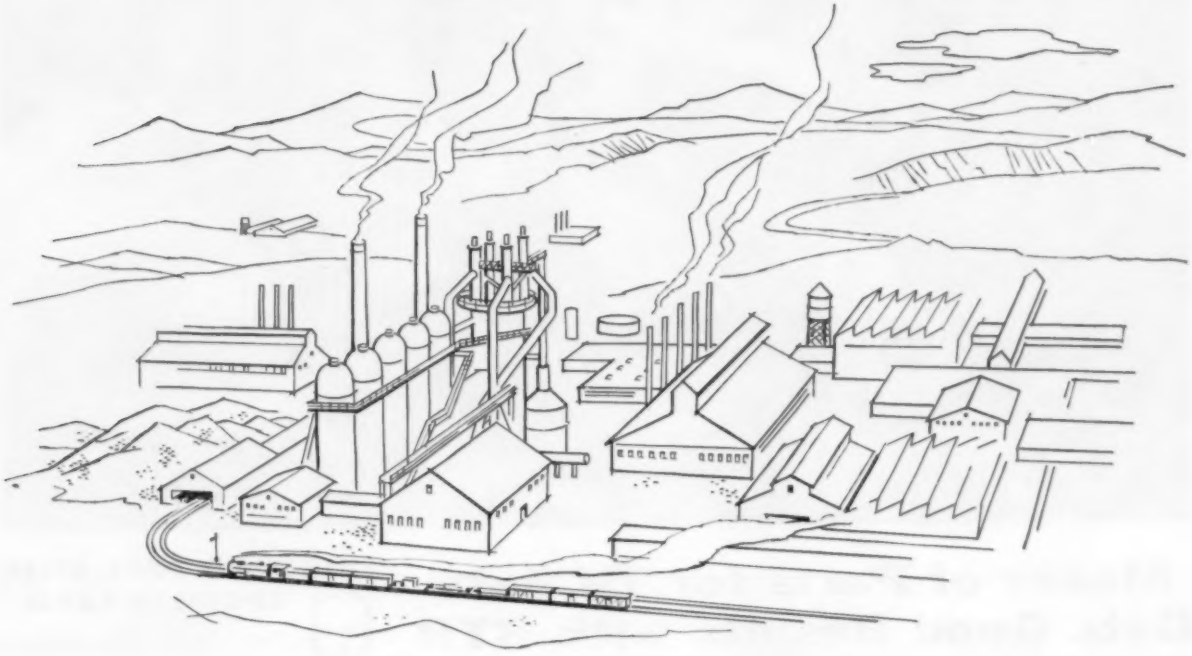
Don't Double Everything!

Attempting to double everything may be a wise policy in the investment field. But it can cause trouble when applied to the selection of tool steels. For example, when a successful production line is to be duplicated in larger size, the same grade of steel should not be used for each part without further consideration.

The main difficulty which arises is that the steel for a given part may not have sufficient hardenability when the part is to be made in a larger size. The reason is that tools which have been only partially hardened through will not be as strong as the deeper hardened or through-hardened tools of the original model. Secondly, the use of low-hardenability steels may be troublesome because the larger tools may be under-tempered in attempting to develop the desired degree of surface hardness. You may find that tools which are improperly tempered sometimes crack in treatment, grinding, or in service. Steel for each tool must therefore be selected with reference to the size in which the tool is to be produced.



Production is smooth as water rolling off your back!



No wonder: **SKF**® has developed a roll neck mounting that meets the demands for higher speeds, closer gauge tolerances, better quality and heavier rolling loads. This multi-row has the features desired by every mill man – most usable capacity in a given space... easy to assemble and disassemble... uses oil or grease, even at high finishing stand speeds.

When you install a new mill, make sure it is equipped with **SKF** multi-row cylindricals. Or have an **SKF** engineer explain how your present mill can be changed over at minimum cost to eliminate roll neck troubles such as breakage, scuffing, excessive bearing failures or high maintenance time and cost. 7737

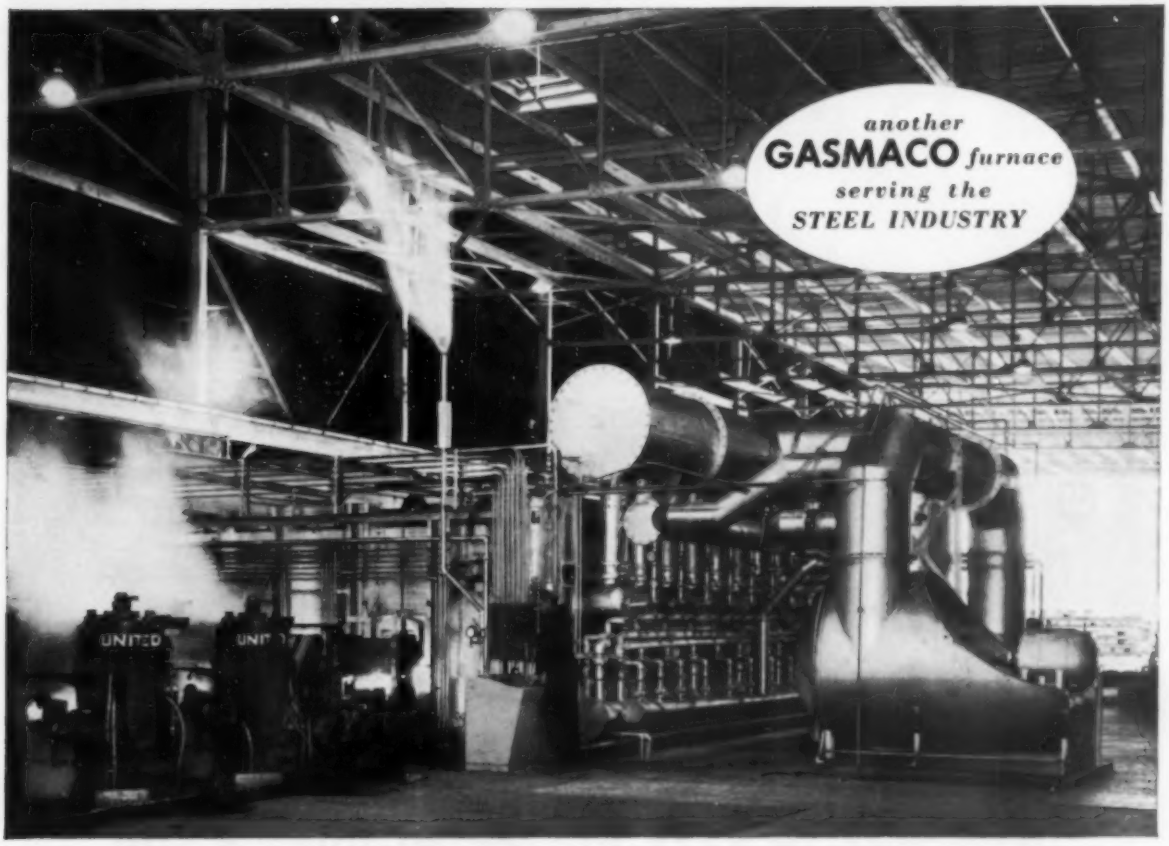
SKF

EVERY TYPE—EVERY USE

- *Ball Bearings*
- *Cylindrical Roller Bearings*
- *Spherical Roller Bearings*
- *Tapered Roller Bearings ("Tyson")*

®Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.



BILLET HEATING

60-ton Furnace at Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation

On this Gas Machinery furnace, reverse flowing of spent gases prevents pile-ups at charge end. Gases pass over the billets and back under before being discharged.

Special holding burners eliminate problems normally encountered in resuming operations after a mill delay.

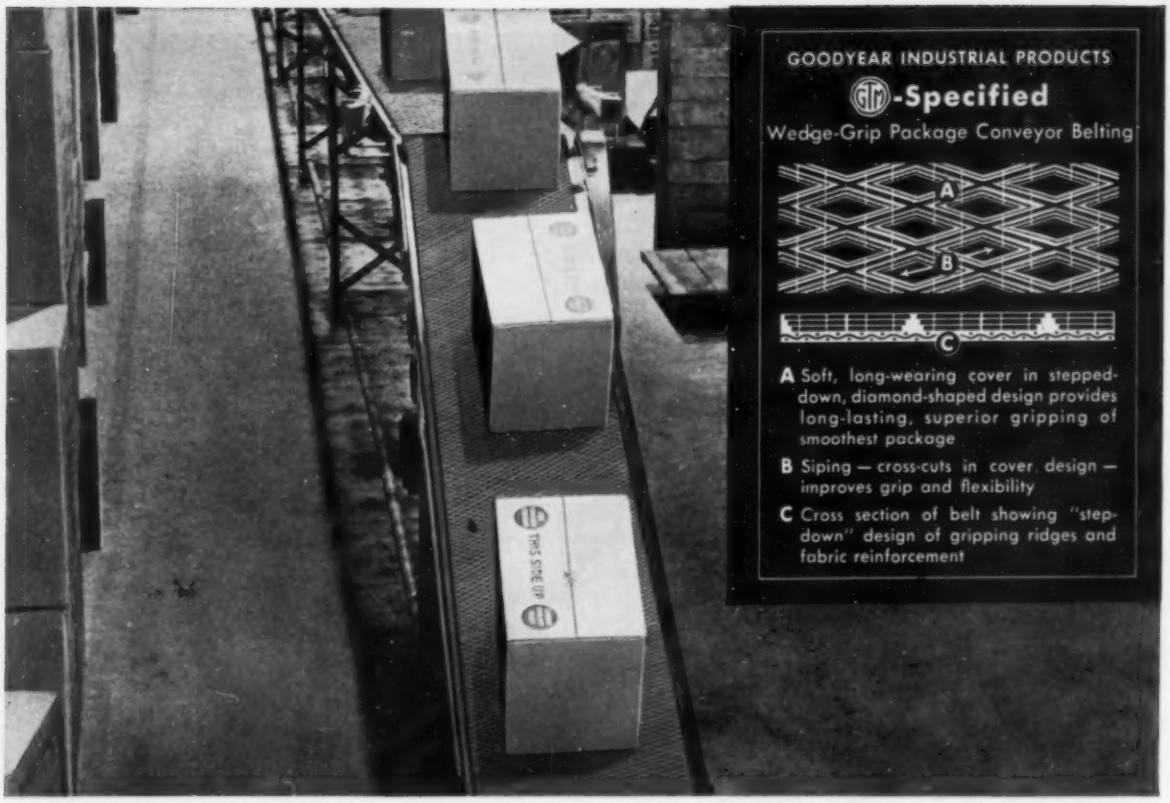
This furnace is supplied with recuperation . . . has modern combustion and control equipment . . . is designed to suit the mill layout.

GASMACO pusher-type furnaces range up to 150 tons — single-zone, double-zone, triple-zone, five-zone. THE GAS MACHINERY COMPANY, 16138 Waterloo Road, Cleveland 10, Ohio. In Canada: The Gas Machinery Co. (Canada) Ltd., Hamilton, Ontario.

Check first with GASMACO for latest industrial furnace designs.

THE **gas machinery** COMPANY

GAS PLANT EQUIPMENT
AND INDUSTRIAL FURNACES


GOODYEAR INDUSTRIAL PRODUCTS
GM-Specified
Wedge-Grip Package Conveyor Belting
A
B
C
A Soft, long-wearing cover in stepped-down, diamond-shaped design provides long-lasting, superior gripping of smoothest package
B Siping — cross-cuts in cover design — improves grip and flexibility
C Cross section of belt showing "step-down" design of gripping ridges and fabric reinforcement

New way to save money without a slip

There's never been anything like this new Wedge-Grip Package Conveyor Belting! It can move almost anything—boxes, bags, cases, cans or what have you. And it can carry them up the startlingly steep inclines without delay-causing slippage.

Credit belongs to the new Wedge-Grip cover design – of unmatched gripping power. Special gripping ridges—in a unique diamond-shaped pattern—hold even the smoothest packages firmly. Their unusual "step-down" design means that whenever a ridge wears off, there's another there to do its job. And this belt sheds clogging dirt and debris as it moves.

What's more, that's only the surface design. A special rubber cover compound was also developed – just for this belting. It's soft for even greater gripping power—yet highly abrasion-resistant. It defies the normal hardening effects of age. It does not mildew. And it won't mark the packages it handles.

But get the whole moneysaving Wedge-Grip story from your G.T.M.—Goodyear Technical Man. He'll be glad to tell you about the complete line of Goodyear package conveyor belts. Just contact him through your Goodyear Distributor—or write Goodyear, Industrial Products Div., Akron 16, Ohio.

WEDGE-GRIP CONVEYOR BELTING by

GOODYEAR

THE GREATEST NAME IN RUBBER

Wedge Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

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The Metalworking Weekly

April 15, 1957
Vol. 140 No. 15

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Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscriptions in the U.S. and possessions and Canada, $10 a year; all other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1957, The Penton Publishing Co.

Index available semi-annually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

Continental

Counterbore Sets Save Your Time— Save Your Tools

A Twist of the Wrist engages or releases the cutters. Double lugs on cutter engage double abutments in holder. Double aligning bearings for rigidity.

Phantom view shows the strong, rigid drive for quick interchangeability of tools.

CONTINENTAL has three STANDARD COUNTERBORE SETS for your selection. They are toolroom favorites. WRITE FOR CATALOG and prices.

CTW

CONTINENTAL TOOL WORKS

Division of Ex-Cell-O Corporation Detroit 32, Michigan

behind the scenes

'Ten-Shun!'

"The hand that rocks the cradle," goes the saw, "rules the world." To this we say pish, and likewise pooh! The philosopher who made that statement obviously had never heard of President Eisenhower's International Trade Fair Program. It will be seen at once that the hand that rules the world is the hand that produces business publications, and if you are inclined to doubt it, consider this report by Secretary of Commerce Sinclair Weeks:

More than 30,000 copies of business publications donated by American business publishers have been used to assemble 32 complete trade promotion libraries. They were sent to 23 foreign countries to facilitate trade promotion work and have made a terrific impression; they introduce buyers and sellers, products and services around the world—and if business doesn't rule the world, what does?

Auto Suppliers Checked

Foxy Don Postma, STEEL's Detroit editor, has been spending much time of late investigating the problems that worry suppliers of the auto industry. Ever since Donald won first prize for guessing the year's auto production—oh, didn't we tell you the story about that? Well, once a year the Automobile Manufacturers Association invites the 30 to 40 journalists who cover the auto beat to a year-end luncheon and guessing match. Guests are invited to predict the number of cars and trucks that will be produced the following year, and our Donald surprised everybody, including himself, by predicting 6.9 million—the actual figure was 6,917,725, and now Postma rates more interest around Detroit than a white-robed journeyman prophet.

The article about the auto suppliers begins on page 75. Fifty years ago, a survey of this type would have considered the activities of whipmakers, blacksmiths, harness makers and assorted wheelwrights, painters and fringe-top makers. Today, it is difficult to think of a single industry that doesn't have some interest in automobile manufacturing.

At one time auto suppliers were tiny satellites circling their giant customers; they waxed and waned even as their parent suns glowed and dimmed. Some suppliers are now larger than former customers, but this type of speculation gets us nowhere. Just be sure to check the story because there is a lot to it.

Power of Advertising

During the course of a recent plant-warming tour at the Reliance Electric & Engineering Co. in Ashtabula O., Editor-in-Chief Irwin Such, together with a number of other interested persons who were invited to view their host's new facilities, found himself facing a large Metalwash machine, produced by the Metalwash Machinery Corp., Elizabeth, N. J. This particular machine was designed to degrease metal parts. A sign affixed thereunto informed all who could read that here was "another Metalwash machine." Directly above the word "machine" some plant wag had written in crayon: "Look for the box of Tide inside."

Irwin didn't think that the Metalwash organization supplied Tide with its machines, but he did think that the compulsion that moved the plant worker to think of Tide was the compulsion that motivates our entire economy—advertising.

Triple Boundary Point

The way Commodore Perry told us the story, a certain Japanese emperor wanted to carve one of his islands into three countries, Onomishima, Ohomishima and Otomishima. "When the new boundary lines are drawn," said the emperor, absently polishing his long fingernails, "there must be two spots where all three countries touch. I will probably erect statues of myself at those spots because I am fond of standing in three countries at one time."

Can *you* draw a map that would meet the emperor's conditions?

Shrdlu

(Metalworking Outlook—Page 69)

Above: Ex-Cell-O Style 243-6 Standard Vertical Method X Electrospark Machine, and at right, some of the shapes it can cut.

NEW! Electrospark Machine FOR TOUGH METALS

Sintered carbides and super alloys—in growing demand these days—are costly to machine, and even more costly to scrap. But you can now machine metals of extreme hardness and toughness easily and economically.

With an Ex-Cell-O Method X Machine, cemented carbides, hardened steels, cast alloys and titanium alloys can be cut off, pierced, slotted, formed, trepanned, drilled and tapped, often in shapes no other machining method can match.

Check on the very real savings Method X may offer to your operations . . . contact Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

57-38

STAINLESS STEEL MAKES THE DIFFERENCE

...its effect on modern styling

Clean lines. A crisp, new look. More functional. Lasting beauty. These are some of the effects modern designers gain with stainless steel—why they use more and more stainless steel every year in cars as well as appliances, housewares, furniture and houses.

To marketers, stainless steel combines the smart selling values of beauty and easy maintenance with the hard selling values of superior corrosion resistance, durability and toughness.

Stainless steel is available in countless work-saving standard shapes. It's readily machined, formed, joined, or cast.

For more facts about stainless steel and the contribution it can make to your product or marketing problems, see your stainless steel supplier or write ELECTROMET—leading producer of more than 100 alloys for the metal industries, including chromium and manganese used for making stainless steels.

ELECTRO METALLURGICAL COMPANY
A Division of
Union Carbide and Carbon Corporation
30 E. 42nd Street UCC New York 17, N.Y.

METALS DO MORE ALL THE TIME ...THANKS TO ALLOYS

Electromet
Trade-Mark
FERRO-ALLOYS AND METALS

Stainless steel styling . . . first to catch the eye and quickest to capture the heart of the consumer. It combines beauty with hardness and strength to resist denting and scratching—and rust is never a problem.

"AFTER ALL...

what can you expect these days?"

When quality isn't up to par or a delivery is three months late, should you blame it on the "times"?

Only if you're willing to!

There's no reason to accept sub-standard work and broken promises... passing them off as "industry's way of doing things today."

Here, at Crosby, we expect as much of our plant these days, as we always have—and so do our customers.

Although habits and attitudes have changed in many quarters during the last 60 years, our business policy has remained the same: Prices (which are fair to the customer and fair to Crosby) are carefully calculated to be complete. They are based on a single standard of quality and are economically sound. Delivery promises are made to be met.

When you order metal stamped parts from Crosby, you can be sure that they will be produced as specified and delivered as scheduled.

METAL STAMPING SINCE 1896 · THE CROSBY COMPANY · BUFFALO, N.Y.

THE CROSBY COMPANY

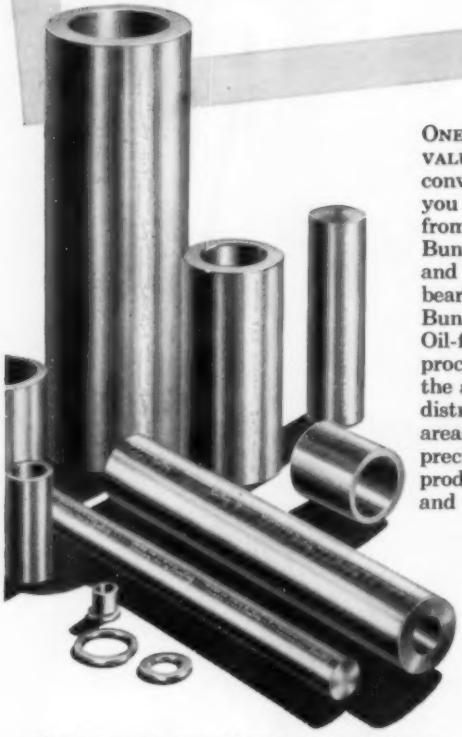
420 William Street, Buffalo 4, N. Y.

OFFICES

Chicago • Cleveland • Detroit • New York • Philadelphia

YOU GET more* WHEN
YOU BUY BEARINGS FROM
YOUR Bunting® DISTRIBUTOR

ONE OF BUNTING'S MOST VALUABLE PRODUCTS is convenience—and it doesn't cost you a cent. You can choose from 1,117 stock sizes of Bunting Cast Bronze Bearings and Bars and 751 stock sizes of bearings and bars made of Bunting Sintered Powdered Oil-filled Bronze. You can procure all these products from the ample stocks of Bunting distributors in all manufacturing areas of America. All are precision, highest quality products, completely finished and ready to use.



All Bunting Sintered Bronze Plain and Flange Bearings are stamped with part number—an exclusive Bunting feature.

Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars—Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.

Bunting

BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL.

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities

LETTERS TO THE EDITORS

Annual Report Found Useful

Please send several copies of your 32nd annual financial analysis of the steel industry, "Steel Industry's Earnings Set Record," (Apr. 1 insert). Being in the investment business, I find this annual report most helpful and informative.

David Tod
Merrill, Turben & Co. Inc.
Youngstown

Need a Special Machine?

Your article, "The Special Machine" (Feb. 4, page 118), presents in complete and orderly fashion, information of exceptional value to us because of the limited sources for optical processing equipment.

I would appreciate six copies to distribute within our industrial engineering, tool engineering and maintenance departments. They must frequently adapt available standard machining equipment to suit our own processing requirements.

John A. Miatech
Industrial Engineer
Argus Cameras
Division of Sylvania Electric Products Inc.
Ann Arbor, Mich.

Glossary to Personnel Men

We would like three copies of the article, "Labor Glossary" (Mar. 11, page 122). They are for the use of our personnel managers at manufacturing plants who have contracts with unions.

Howard J. Berkel
Director of Personnel
Bryant Mfg. Co.
Indianapolis

Splendid Contribution

Thanks for sending so promptly the copies of the article, "Steel Leads the Way" (Dec. 31, page 38). If available, I would appreciate receiving eight copies of your Program for Management article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93).

Our own company devotes a great deal of thoughtful action to management training.

The information in your article is so carefully arranged and presented that it is of more than casual value. It makes a splendid contribution to the material written on this subject.

T. W. Prior's Bible quotation in your article—prefaced by his remarks that "the methods and tools used are not so important as a sincere interest in

(Please turn to page 12)

WE WON'T STAND BY OUR RECORD!

If we did, we'd never get ahead. Whitney Chain has kept moving for over 60 years, starting with the introduction of alloy steel for bicycle chains . . . back when.

Today, Whitney's most recent pace setters are Self-Lubricating Single and Double Pitch Roller Chain and "F-R" Processed Roller Chain. Both of these chain advancements bring you cost saving concepts that deserve your consideration for todays' or tomorrows' drive-design programs.

For example, Whitney Self-Lube Chain outlasts regular chain as much as 5 to 1 under continuous service in extremes of dust or moisture. Here, Whitney's exclusive sintered steel bushings "oil cleanly from the inside", are prelubricated for life, cannot trap abrasive matter which cuts chain life. Ideal for applications in food, drug, textile and many industries where external chain lubrication is not practical or desirable.

And Whitney's "F-R" (fatigue resistant) Processed Roller Chain is setting new service standards for durability, particularly on problem drives involving unusual operational conditions, stresses and heavy shock loads. This performance comes from the exclusive Whitney "F-R" process which offsets excessive operational stresses in the chain.

These new chains with dynamic, balanced design, serve better, longer and at less over-all cost . . . and so does Whitney's entire line of A.S.A. Roller, Silent and Conveyor Chain . . . all precision engineered for top quality.

Whitney field engineers, warehouses, and alert distributors assure top service from complete stocks . . . nation-wide.

Write for full technical literature.

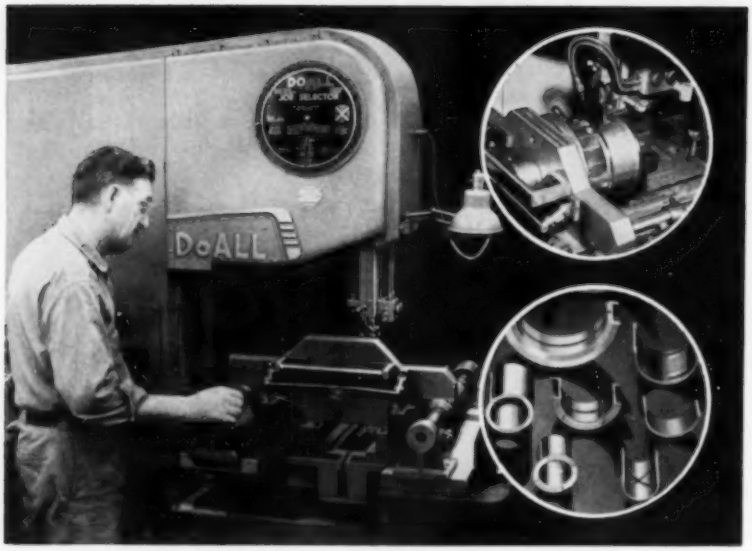
Whitney

CHAIN COMPANY

249 Hamilton St., Hartford 2, Conn.

ROLLER CHAIN • SILENT CHAIN • CONVEYOR CHAIN • SPROCKETS • FLEXIBLE COUPLINGS

We invite you to visit our Booth #322 at the 1957 Design Engineering Show.



MANUFACTURING more transportation at minimum cost . . .

How to Keep The Economy Highballing

Each year, every breadwinner has more mouths to feed! Here is why:

Our population expands per year about . . . 1.7%
(and people are living longer and retiring earlier). Our "labor force" (the age group that brings home the pay check) expands only about . . . 1.0%

This difference—of fewer breadwinners every year equals . . . 0.7%
This means constant pressure for bigger pay checks.

The only answer is more and better tools of production. Only then can a man produce more and earn more, without forcing prices up hand in hand with wages.

The machine tool in the picture above illustrates the principle. With it the operator splits bearings for diesel locomotives in half the time

required by the old method. This new machining method enables him to produce more at lower cost per unit. Time savings like this throughout industry, add up to a greater quantity of goods for everyone . . . at reasonable prices. This is the only way the working force can support an increasing number of dependents.

The DoALL machine shown is industry's newest basic machine tool. It will do many jobs in ⅓ to ½ the time required by other machine tools. Cutting is faster, fixturing is simpler and initial investment is lower.

Any manufacturer seeking production savings is invited to see a free demonstration at his own plant.

Reprints of this series on economics available for your employees.

ASK FOR LITERATURE describing the newest DoALL band machines with hydraulic power feed, Demon high speed steel saw bands and many other improvements. Call DoALL locally, or write.

The DoALL Company
Des Plaines, Illinois
38 Local Sales-Service Stores E-47

LETTERS

(Concluded from page 10)

the development of people"—should certainly confirm, as we try to do, that the objective is attainable, wherever there is work to be done and men required to direct it.

E. J. Williams
President
Armco Argentina S.A.
Buenos Aires, Argentina

Chart To Be Reprinted

We would appreciate two reprints of your article, "Warehouses Top List of Mill Customers" (Mar. 18, page 178). We would also like permission to reprint the chart, "Who Got the Steel—1956," in our employee newspaper. We believe it would be of great interest to our people.

M. L. Evans
Editor
Carolina-Salem Angles
Carolina Steel & Iron Co.
Greensboro, N.C.

Lauds Sound Technical Basis

Please send a reprint of the article, "Make Complex Shapes in Continuous Strips" (Mar. 4, page 95). This is No. 9 in your Production Ideas series. It is well presented and has a sound technical basis.

Walter L. Johnson
Shakeproof Division
Illinois Tool Works
Chicago

Emphasizes Milling Problems

The article, "Exploring the Thermal Barrier" (Mar. 11, page 154), gives added emphasis to some of the milling problems which are filtering into our organization.

Indications are that the only way to machine these materials is to use machine tools with maximum rigidity and power and rugged milling cutters . . . tipped with carbides capable of giving longer life at higher cutting speeds than the present ones.

Much depends on improved fixture design.

Please send an extra copy.

Fred W. Lucht
Director of Research
Goddard & Goddard Co.
Detroit

Protection Against Inflation

We found your article, "How To Be a Junior Giant" (Apr. 1, page 62), interesting, and we would appreciate two copies.

A. A. Wright
Vice President
Meaker Co.
Chicago

Query on Extruded Shape

We are interested in obtaining a source for the seven-toothed shape used in sprockets for chain saws, as described in your Production Ideas article, "Pieces by the Slice" (Feb. 4, page 101).

C. Davis
Assistant Buyer
Hoffco Inc.
Richmond, Ind.

• *Produced by Jones & Laughlin Steel Corp., it is a hot extrusion which has been cold drawn. It is supplied in 6-ft lengths.*

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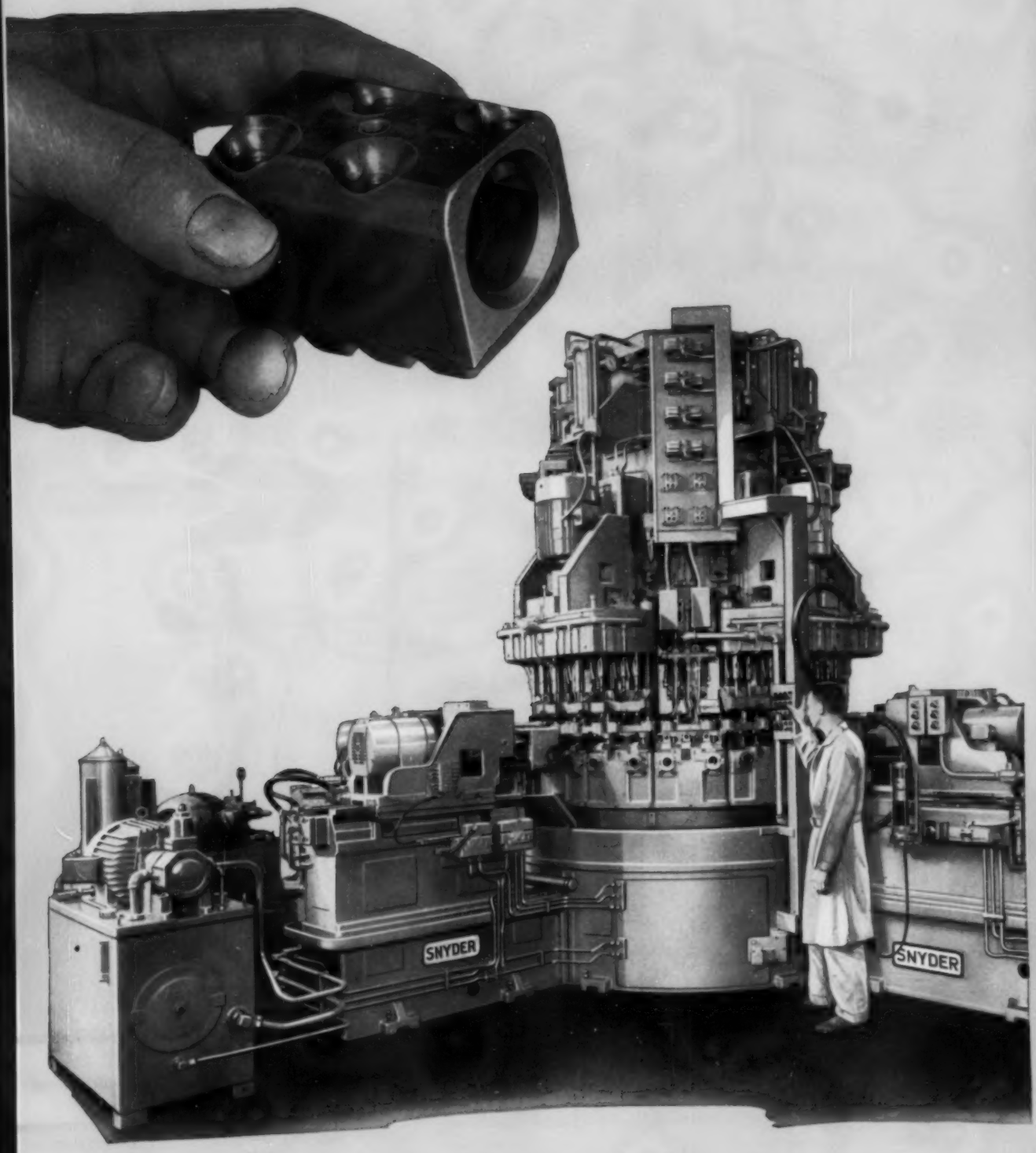
Simplified Automation in
Successfully Applied in New



Machining Small Parts is Snyder Center Column Machine

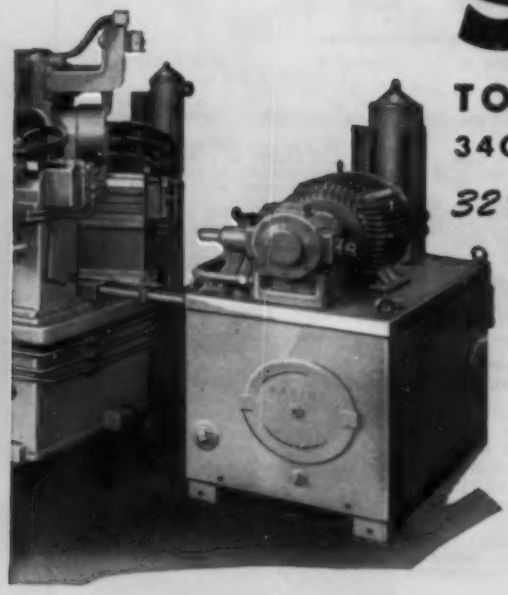
The principle of automation is inherent in the design of this machine which performs, in its continuous 16-station cycle, 25 operations equalling the performance of two or three ordinary machines. The workpiece is a small automotive steering gear ball nut 2½" x 1⅝" x 1⅞". Production is 331 pieces per hour.

Three workpieces are loaded and automatically clamped in each of the 16 fixtures on the 96" index table. A unique feature of the machine is its special heavy-duty cast iron center column 108" high and 48" in diameter. This massive column is necessary to withstand the high vertical thrust loads imposed by six heads mounting 9 spindles each which drill, flat bottom drill and radius chamfer four recirculating ball holes and tap drill and chamfer one hole in the same part face.

The table is also designed to withstand high horizontal thrust loads for core drilling, chamfering and reaming the threaded shaft hole which requires three spindles for each of the seven Snyder heavy-duty way type units.

The machine, one of the largest of its type, weighs 50,000 lbs., requires 288" x 312" floor space and stands 156" high overall.

If you have an automation problem in machining small parts, this type of Snyder machine may be the right answer.



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TOOL & ENGINEERING COMPANY

3400 E. LAFAYETTE • DETROIT 7, MICHIGAN

32 Years of Special Machine Tools with Automation

How to Meet the PRESSURE ON PRICES

Anthony J. Lucas

METHODS MANAGER, THE CINCINNATI GEAR CO.

When a manufacturer is faced with cost increases, the easy thing to do is to pass the increase on to the customer. We're faced with this temptation just like everyone else. In the past 20 years, our wage rates have risen to over three times their old level; the composite price of steel has risen to about 2½ times the old price; taxes, shipping, equipment costs have all multiplied similarly. But just as we are under this pressure to *raise* our prices accordingly, we are also under pressure from you the customer to keep the price of our product within reason. There is only one way out of this dilemma for us — to improve our efficiency. And that is what we are constantly doing — with new, more efficient machines and equipment, and improved production facilities. Machinery and methods of even a few years ago are inadequate by today's standards of competition. For this reason, if you've traditionally been making your own gears, or obtaining them from a small shop in the neighborhood, we suggest you consult your nearest Cincinnati Gear representative to see how our ultra-modern set-up compares *today* — and find out what we can do for you in the three important categories of quality, service, and price on your custom gear needs.

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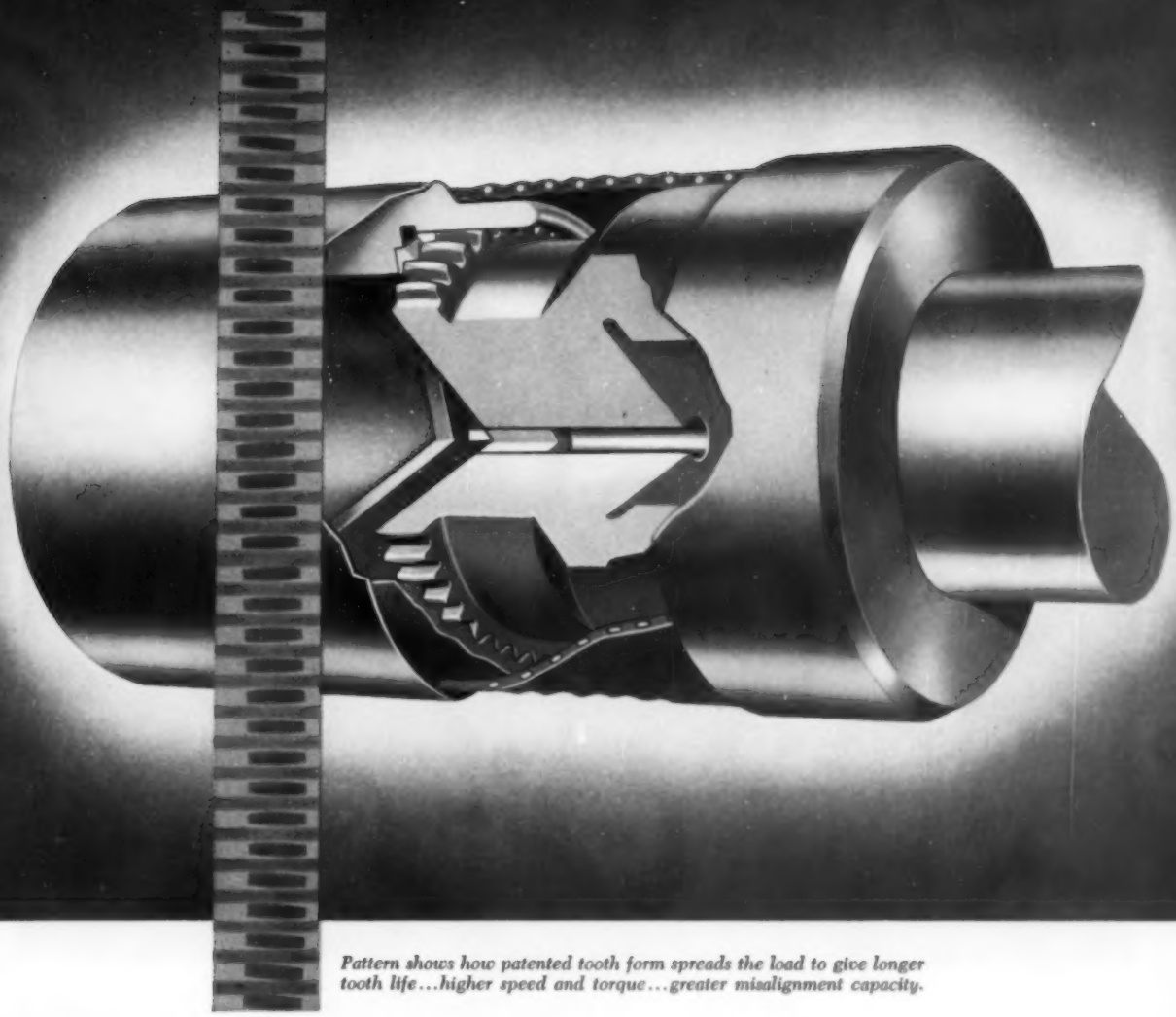

Pattern shows how patented tooth form spreads the load to give longer tooth life...higher speed and torque...greater misalignment capacity.

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Many installations of the Amerigear spindle coupling have operated continuously without tooth failure for four years.

The secret of the long-lasting teeth of the Amerigear-Bliss spindle is their patented fully-crowned form. This eliminates tooth end and tip loading and permits greater angular or lateral misalignment; this results in constant velocity, minimum wear and minimum power loss. The crowned flank maintains the load on the central portion of a greater number of teeth, making higher torque ratings possible, and holding backlash to a minimum.

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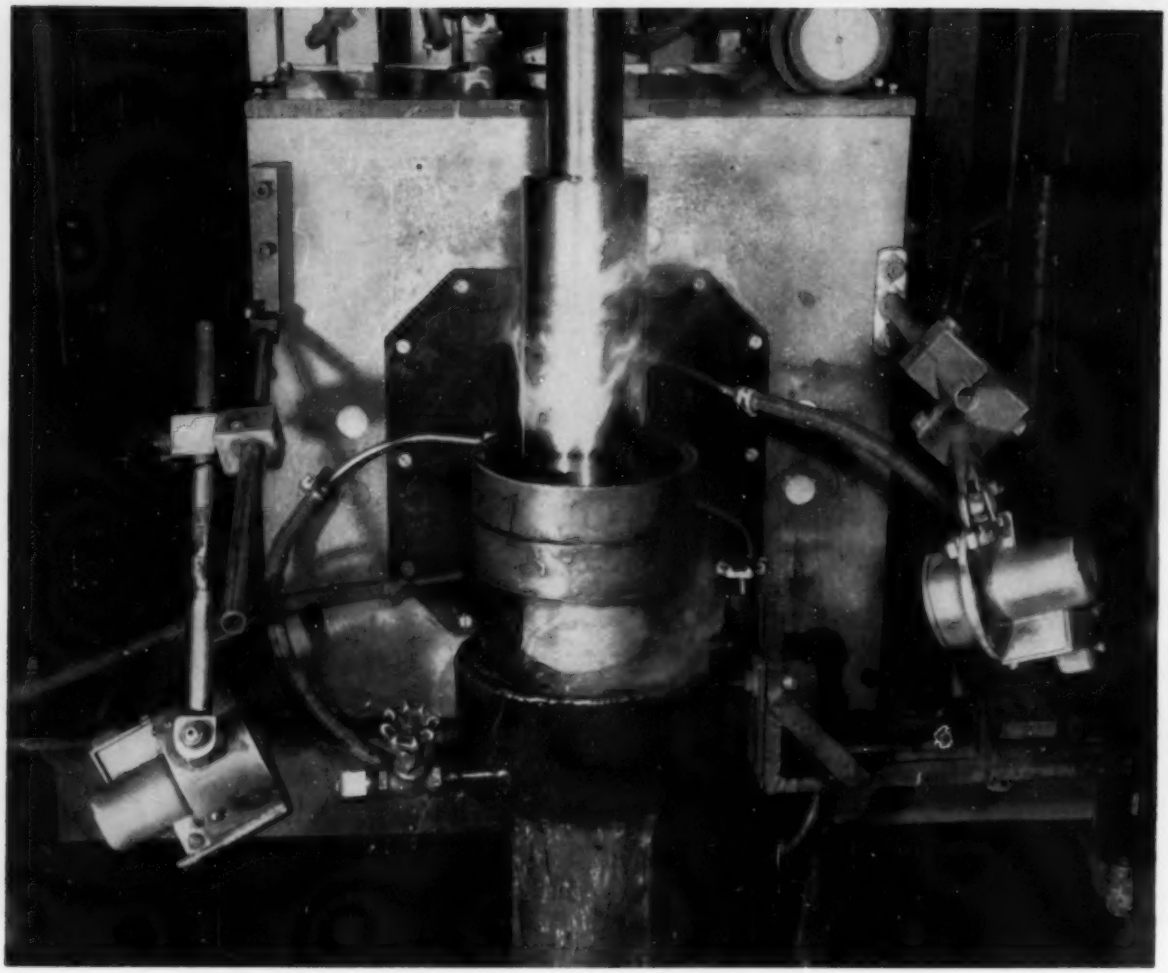

Soaking up heat radiation...

. . . these two L&N Rayotube® detectors are helping McKay Machine Company induction-harden bodies of leveller rolls. About four years ago, this manufacturer of sheet, tin and strip mill equipment switched to full time induction hardening of these shafts which range from 7/8" to 12" in diameter and up to 12' long. The new method doubled production . . . eliminated warpage . . . and provided scale-free hardening. And, in addition, the use of L&N temperature control enabled the McKay Machine Co. to reduce setup time . . . eliminate trial runs . . . and produce the same results heat after heat.

The temperature regulating equipment consists of Speedomax®-Rayotube control on each of two 3000-cycle induction generators having a maximum capacity of 400 kw. One Speedomax in combination with a Rayotube detector controls work temperature by operating a motor-operated rheostat to regulate power input to the induction coil. For quality control, a second Speedomax-Rayotube combination measures and records quench temperature while a third Speedomax provides a record of work speed through the coil.

To find out how L&N temperature control may help increase the efficiency of your induction heating, contact your nearest L&N sales office or write 4957 Stenton Ave., Phila. 44, Pa.

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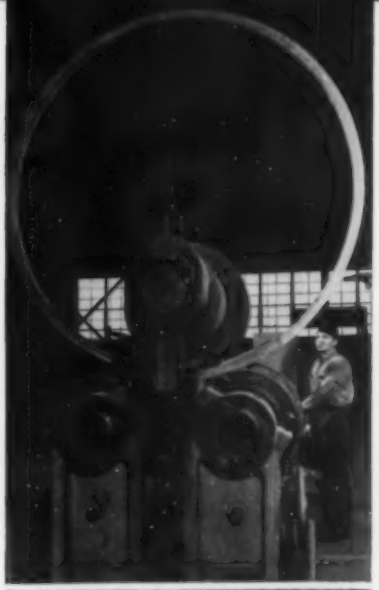

For Formability...

Jet engine and pressure vessel makers are using roll-formed rings in large numbers these days. Alloy Manufacturing Company in Pittsburgh is a major supplier of Stainless Steel fabricated parts, and they process this steel on ordinary "carbon steel rated" equipment without difficulty.

For Cleanliness...

Bates Manufacturing Company, Lewiston, Maine, is a famous name in cotton goods. They used to have trouble with dyeing equipment; the iron vats held the old colors and "killed" new colors. With Stainless Steel dye kettles, old colors actually *rinse* out, without costly scrubbing.

For Style...

G & G Woodcraft, Dinette Division, in Detroit, is selling a handsome new dinette table, designed by Gelitis, with a polished Stainless Steel top. The top is backed with plywood, and there is no metallic sound when it is struck. Stainless is a perfect material for contemporary design, and it's so *practical.*

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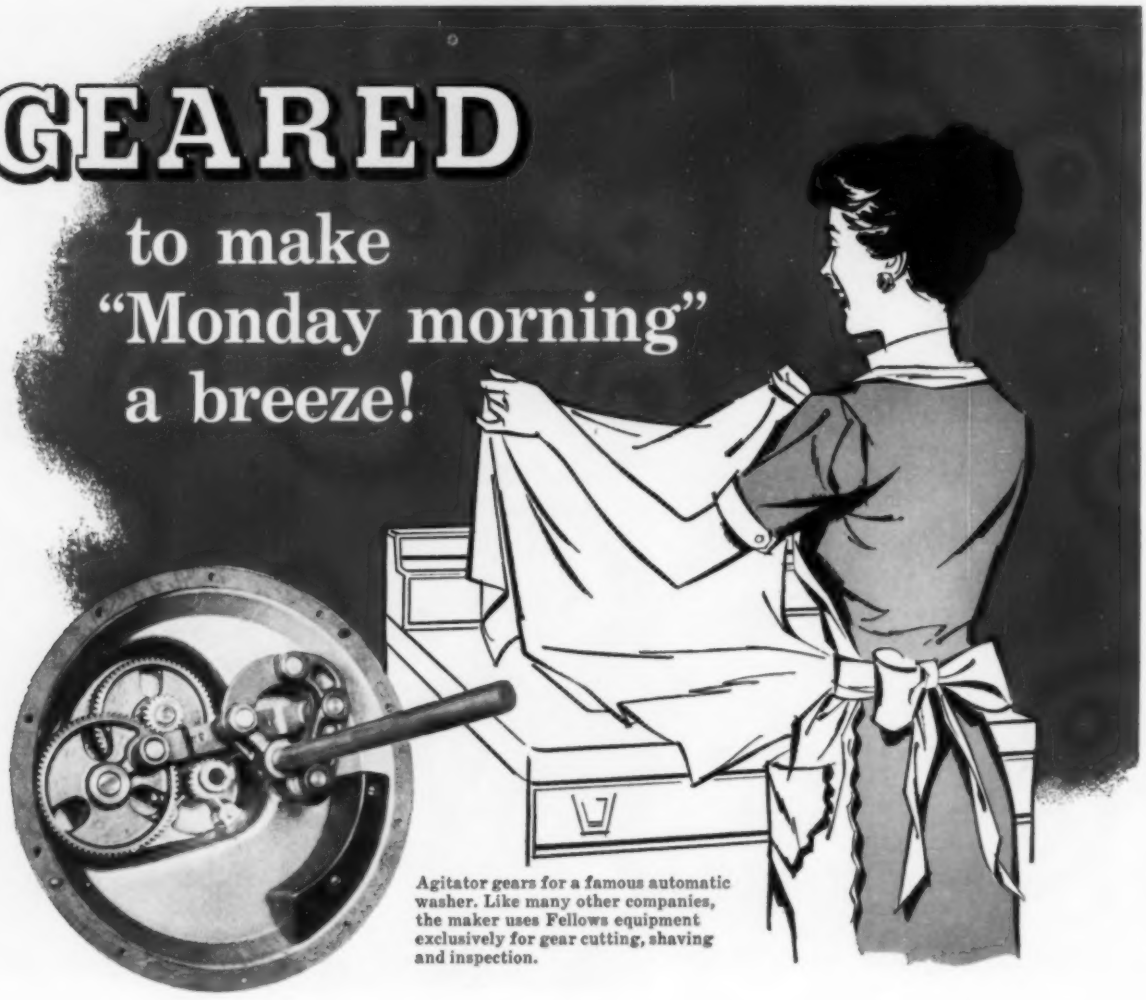

Agitator gears for a famous automatic washer. Like many other companies, the maker uses Fellows equipment exclusively for gear cutting, shaving and inspection.

Consider that modern marvel, the washing machine! It may handle *unbalanced* loads of 75-pounds of clothes and water... but it keeps working efficiently and quietly day after day, year after year. Yet it costs so little nearly everyone can own one.

The use of gears cut on Fellows Gear Shapers is one of the important factors contributing to the long-time, trouble-free service today's washers give. These gears must be of high quality and production cost must be low. Many makers of washers and other major appliances meet these requirements for accuracy and economy by cutting their gears—and other shapes—on modern Fellows Production Equipment.

Your own gear cutting needs, from 1/16" to 120" P.D., can probably be met more profitably and efficiently with Fellows Gear Production and Inspection equipment. Why not get full information? Write, wire, or phone any Fellows office.

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Apr. 15-17, American Society of Lubrication Engineers: Annual meeting and exhibit, Sheraton-Cadillac hotel, Detroit. Society's address: 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: William P. Youngclaus Jr.

Apr. 15-17, Building Research Institute: Annual meeting, Drake hotel, Chicago. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Executive director: W. H. Scheick.

Apr. 23-24, American Institute of Electrical Engineers: Biennial conference on electric heating, Commodore Perry hotel, Toledo, O. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Apr. 23-25, Grinding Wheel Institute and Abrasive Grain Association: Spring meeting, Homestead, Hot Springs, Va. Information: Hunter-Thomas Associates, 2130 Keith Bldg., Cleveland 15, O.

Apr. 23-26, Steel Shipping Containers Institute Inc.: Annual meeting, Palm Beach Biltmore hotel, Palm Beach, Fla. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Apr. 24-25, National Industrial Research Conference: Conrad Hilton hotel, Chicago. Sponsor: Armour Research Foundation, Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

Apr. 24-26, American Zinc Institute and Lead Industries Association: Joint annual meeting, Drake hotel, Chicago. Information: 60 E. 42nd St., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Apr. 25-26, American Society of Mechanical Engineers and Society for Advancement of Management: Annual management engineering conference, Hotel Statler, New York. Society's address: 74 Fifth Ave., New York 11, N. Y. Executive vice president: Harold R. Bixler.

Apr. 25-26, American Society of Mechanical Engineers: Railroad division conference, Sheraton hotel, Chicago. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Apr. 27-May 2, Scientific Apparatus Makers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 20 N. Wacker Dr., Chicago 6, Ill. Executive vice president: Kenneth Andersen.

Apr. 29-May 1, Association of Iron & Steel Engineers: Spring conference, Hilton Plaza hotel, Cincinnati. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Apr. 29-May 1, Chamber of Commerce of the U.S.: Annual meeting, Washington. Chamber's address: 1615 H St. N.W., Washington 6, D. C. Executive vice president: Arch N. Booth.

Apr. 29-May 3, National Materials Handling Exposition: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Apr. 30-May 1, Metal Powder Association: Annual meeting and exhibit, Drake hotel, Chicago. Association's address: 130 W. 42nd St., New York 36, N. Y. Secretary: Kempton H. Roll.

Apr. 30-May 2, Investment Casting Institute: Annual spring meeting, Sheraton Park hotel, Washington. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: H. P. Dolan.

May 1-3, Electronic Components Symposium: Morrison hotel, Chicago. Information: J. S. Powers, Electronic Components Symposium, 84 E. Randolph St., Chicago 1, Ill.

May 1-3, Society for Experimental Stress Analysis: Annual meeting, Hotel Statler, Boston. Society's address: P.O. Box 168, Cambridge 39, Mass. Secretary: W. M. Murray.

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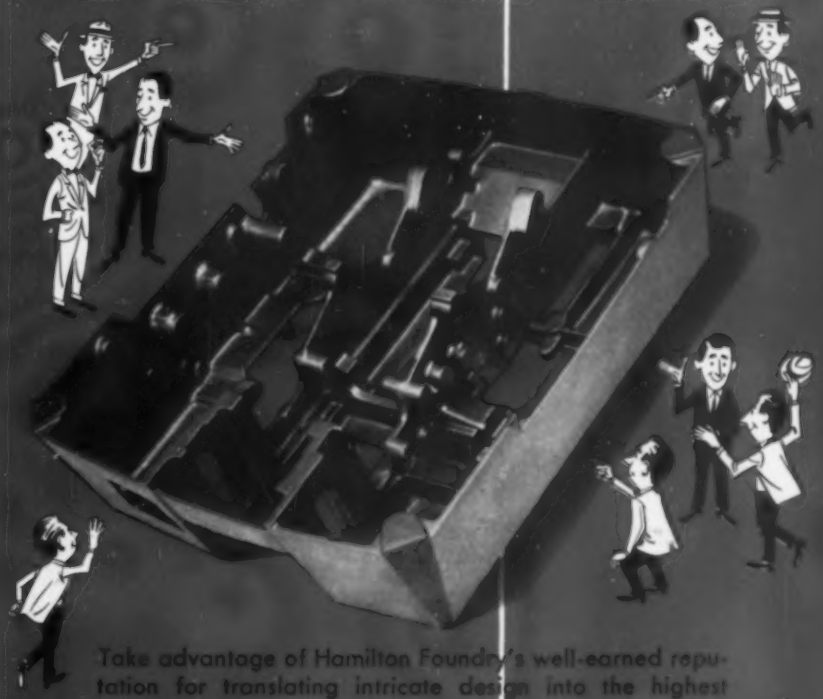

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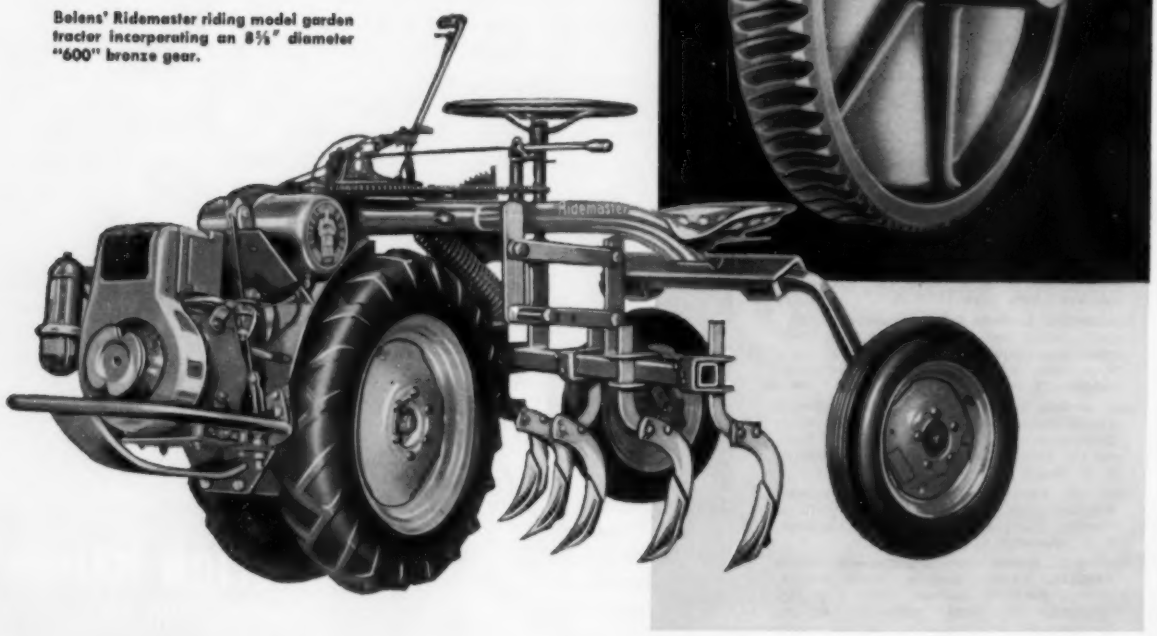
Mueller Brass Co. "600" bearing bronzes are available as forgings, or in rod form. They provide unusually high tensile strength, a dense structure, good resistance to corrosion, and excellent bearing properties. Because of their good machining qualities, the "600" series bronzes can be finished readily—usually at substantial savings in COST.

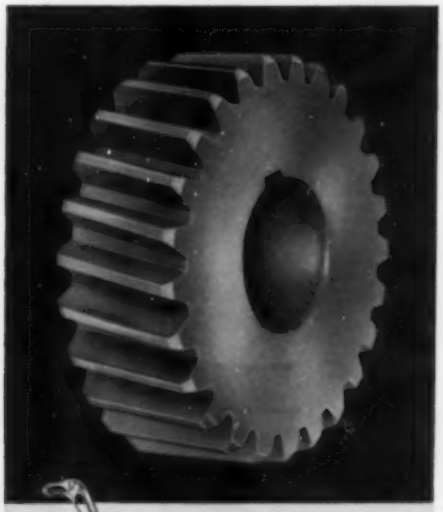
It will pay you to investigate these alloys for your products . . . why not write today for full information.



Bolens' Ridemaster riding model garden tractor incorporating an 8⅝" diameter "600" bronze gear.

and TILLERS prove

CO.



Bolens' Super Mustang rotary tiller incorporating a 25-tooth "600" series bronze worm gear.

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40 MUELLER BRASS CO 1917-1957

MUELLER BRASS CO.

PORT HURON 26, MICHIGAN

METALS AND ALLOYS REVIEW

by **FRANK M. LEVY**

Vice-President and Director of Research

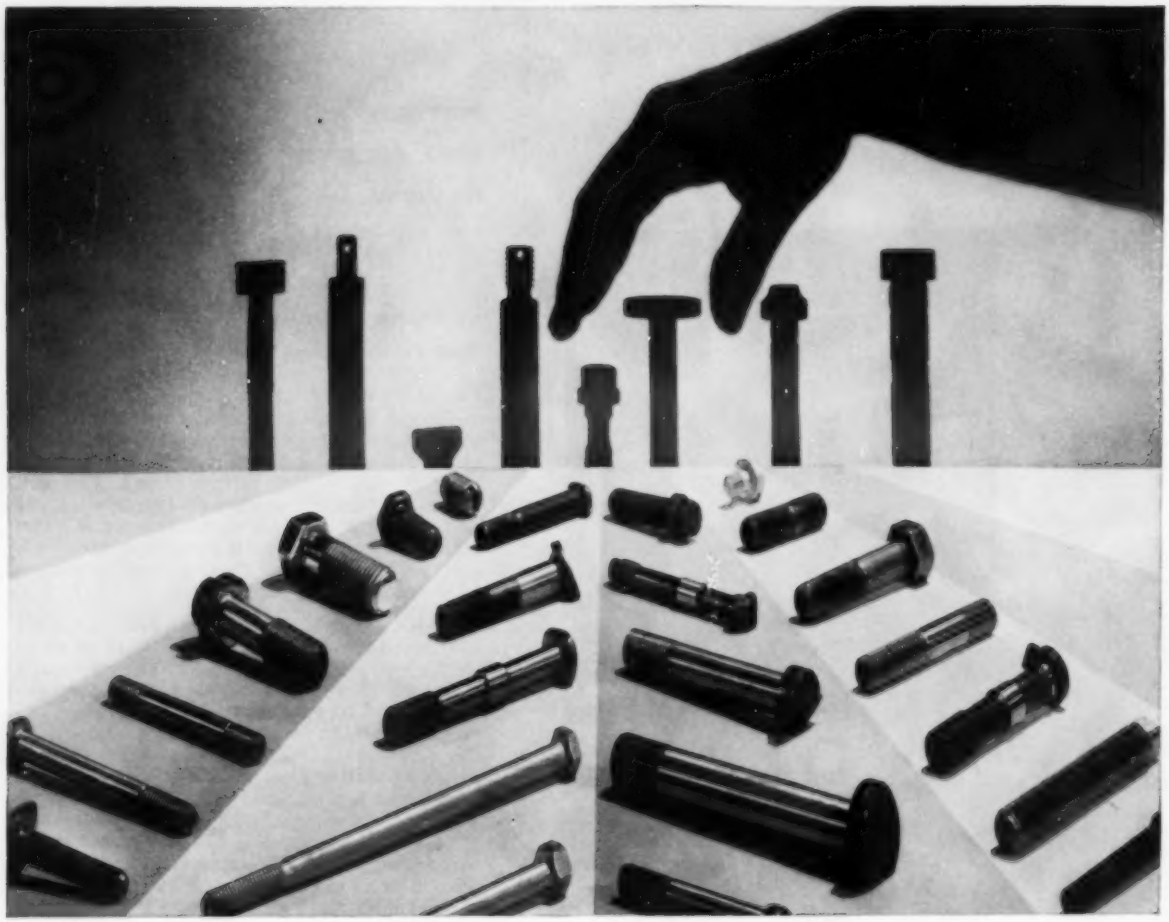
One of the most interesting things about our 600 series bearing alloys is the great variety of products in which they find application. In the advertisement to the left you can see how the Bolens people put 600 gears to work in their rotary tillers and garden tractors. Those gears are big, take a lot of abuse, and meet the job needs perfectly. We also make a lot of small parts, too, that have been specified because of the many unusual properties of this series of alloys.

One good example that comes to mind is a shaft bushing on a rotary selector switch that we make for an instrument manufacturer. This selector is used for switching sound-powered telephone circuits aboard Naval vessels. One of the most important considerations in the choice of 600 alloy for this bushing was its resistance to abrasive action on and against a rubber "O" ring. The acceptance test required a stainless steel shaft riding in the bushing to rotate "dry" for a minimum of 50,000 cycles consisting of 360° rotation clockwise followed by a 360° rotation counter-clockwise. The "O" ring must still form a watertight seal at the end of the test. Our 602 alloy was the only one of several materials tested that met the specs. That was pretty good evidence in itself of resistance to abrasion, but, in addition, this customer also found that the use of 602 eliminated the headaches they previously had with seizing and galling.

The pounding action caused by the indexing mechanism attached to the shaft used to give them no end of seizing troubles. The chief product engineer is extremely happy about the way our alloy is performing. Mention was also made of the fact that the corrosion resistance of 602 was mighty impressive. In this application, the alloy passed the 200-hour Navy salt spray test with flying colors.

So, big or small, it seems that there is no end of applications for 600 series alloys. We even have parts working in a machine that slices frankfurters as well as gears in fishing reels. So, it seems that 600 runs the gamut from "red hots to reels". Well, it looks like the end of the page is here again, so I'll close for now. However, if you have any problems or questions about non-ferrous alloys or you're having trouble getting desired performance from a part, why not drop me a line here in Port Huron, and possibly I can be of some service. Send a part print along if you like, and we'll be glad to make proper recommendations.

Thanks again for your time.



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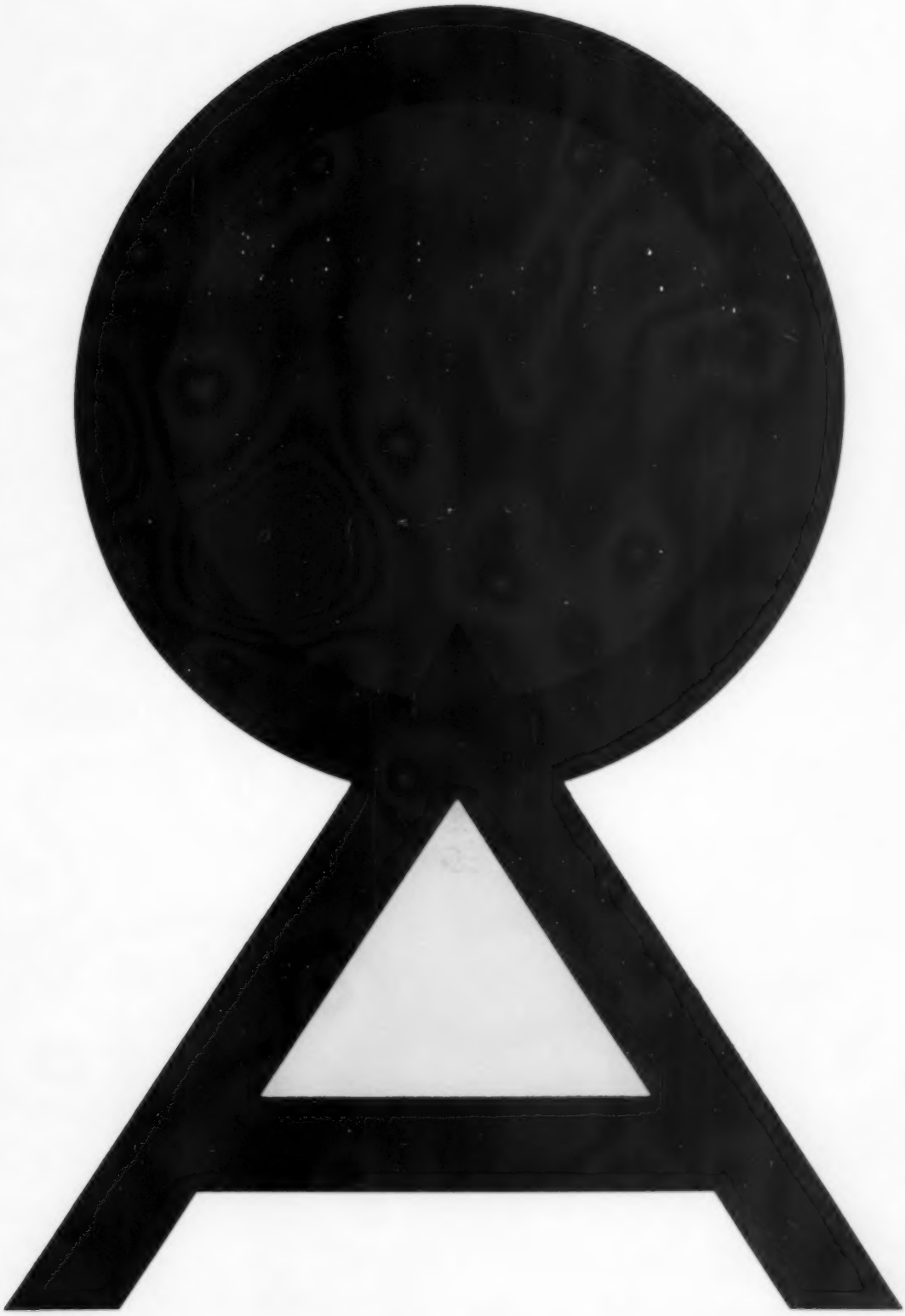


Symbol of Olin Aluminum - and of a new concept of service standards in the Aluminum Industry . . .

Olin Mathieson
Chemical Corporation
one of the world's largest
suppliers of Chemicals, Metals and
Packaging Products, announces

an important new source of Aluminum

A MAJOR NEW OLIN MATHIESON DIVISION — WITH A DYNAMIC NEW CONCEPT OF QUALITY AND SERVICE

Important news for users of Aluminum and other metals is the full-scale entrance of Olin Mathieson Chemical Corporation into the primary Aluminum field.

Right now, limited quantities of Olin Aluminum are being produced at four locations, and soon an initial annual capacity of 240 million pounds will be a reality.

Benefiting from Olin Mathieson's already extensive experience in the metals field, Olin Aluminum will become a major source of unusually fine-quality Aluminum. And as a result of its full integration—from Bauxite to rolling mill—Olin Aluminum will be in a position to assure its customers a *dependability* of delivery that will be of vital importance.

A New Concept of Service Standards

Of equal significance is Olin Aluminum's new concept of service standards. Its new plant facilities will be the finest, most modern in existence—thus assuring the ultimate in production quality and economy. Its technical staff is composed of men of broad and extensive experience—ready to work side by side with your own engineers toward the one best solution to any of your Aluminum problems. And Olin Aluminum's new sales team consists of men with a minimum of five years of thorough experience in the Aluminum field.

The combination of these three things—new plant, experienced technicians and imaginative service per-

OLIN ALUMINUM

sonnel—will result in Aluminum of competitively superior metallurgical quality, tolerances and finishes.

A $300 Million Investment

Behind the birth of Olin Aluminum lies an exciting industrial drama. Recognizing the growing world need for Aluminum, Olin Mathieson—already greatly experienced in the production of non-ferrous metals through its Western Brass Mills Division—joined with Revere Copper and Brass to organize the Olin Revere Metals Corporation. The purpose of this united effort was to construct and operate the complete facilities necessary for the production of primary Aluminum. The Olin Revere Shipping Corporation was formed to import the huge quantities of Bauxite needed, and keels were laid for its three giant new 16,000-ton ore ships of revolutionary design.

Simultaneously, at Burnside, Louisiana—an ideal deep-water port—construction was begun on a large new Alumina plant. And on the Ohio River, at Clarington, Ohio, work was begun on the first reduction plant ever to have its own integrated coal supply and power-generating facilities. These new plants, fruits of a $300 million investment, form the assured source of supply for Olin Aluminum.

Better Tolerances, Finishes and Alloys

Two-thirds of the output of this fully integrated primary Aluminum production system will go directly to the new Olin Aluminum Rolling Mill at nearby Omal, Ohio, and to other Olin Aluminum facilities in the Midwest, on the West Coast and on the Gulf Coast. From these modern plants will flow custom-made Aluminum better adapted to your individual needs than any you have ever before been able to obtain. That is the goal of Olin Aluminum: a new concept of quality and service in the Aluminum Industry.

Turn the page for more news about Ω ⟶

The men from Olin Aluminum
will soon be calling on you to tell
you more about our services
and to explain how custom-made
Olin Aluminum can help you
cut your present manufacturing
costs. Meanwhile, as you plan
your immediate Aluminum needs,
we cordially invite all inquiries.
Write to Aluminum Division—Sales,
Olin Mathieson Chemical Corporation.
460 Park Ave., New York 22, N. Y.

OLIN
ALUMINUM

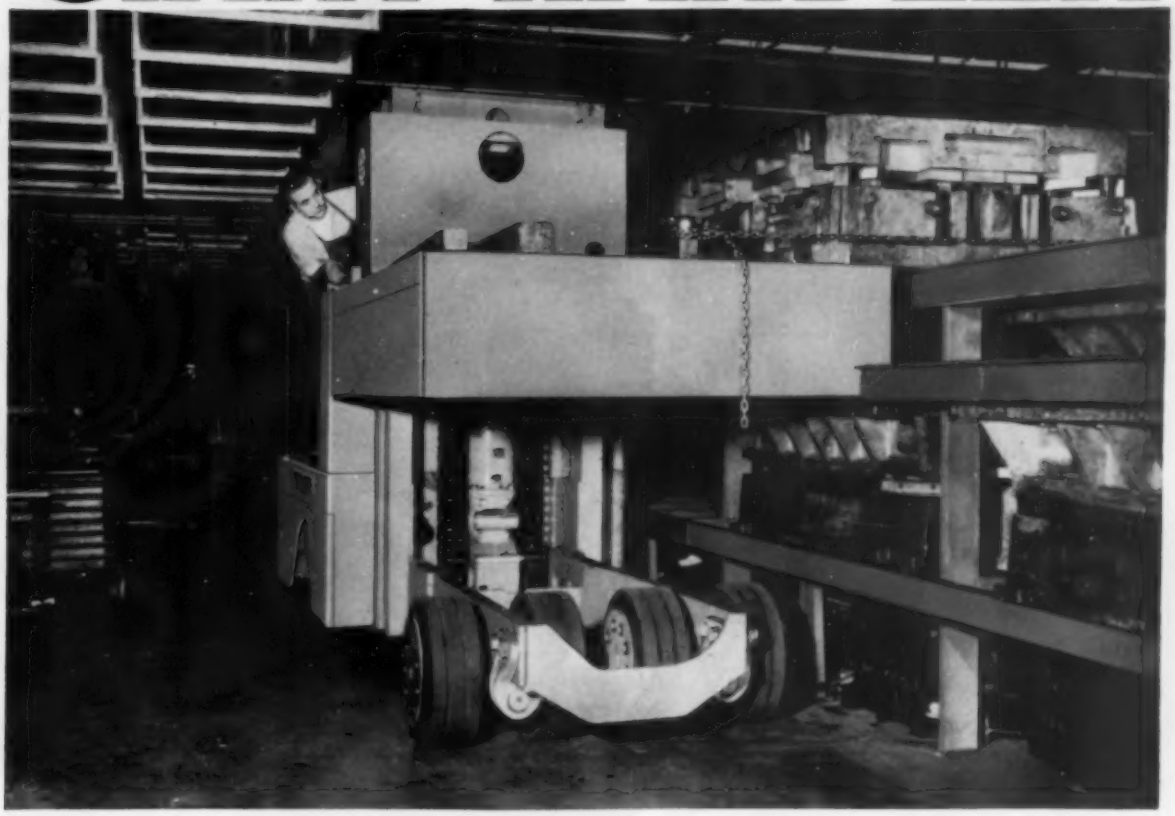
ALUMINUM DIVISION
OLIN MATHIESON CHEMICAL CORPORATION

Producers of many fine products
under such brand names as
WINCHESTER • OLIN • SQUIBB
MATHIESON • WESTERN

Watch for Further News About the
Big New Name in Aluminum

AND "OLIN ALUMINUM" ARE TRADEMARKS

GIANT HANDLER



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Tighter Coils For Better Springs

Co-owners Walter Pesaresi (left) and James Berg of Winamac Coil Spring examine coil of Pittsburgh Steel Oil Tempered Wire and a stock of coiled springs, ready for shipment.

Pittsburgh Steel's O. T. Wire Does Job For Winamac Coil Spring

When a spring-coiling job comes along so tough that many spring-makers dodge it, a satisfactory spring usually depends on combining human know-how with the right kind of quality steel wire.

A balance spring that supports the mower on a farm mowing machine presented such a problem recently to the Winamac Coil Spring Company in Winamac, Ind.

This is the story of how one man's knowledge of wire and spring-making produced a more than satisfactory spring on a difficult job.

The 16⅝ inch long spring, coiled exceptionally tight and made of Pittsburgh Steel Company's Oil Tempered Wire, has 30 coils. Two and one-half coils at each end are passive. They hold a plug inserted by the farm implement manufacturer who buys the springs which support the weight of the mower on the tractor.

Springs often were rejected because of improper initial tension and burrs which interfered with insertion of plug ends.

Walter Pesaresi, co-owner and co-founder of Winamac Coil Spring Co. and a spring-maker all his life, credits three factors for his success in coiling the springs properly.

1. Selection of Pittsburgh Steel's Oil Tempered Wire.

2. Development of a new device which permitted tighter coiling.

3. Proper heat-treating techniques for stress-relieving the steel after coiling.

• **The Right Wire**—"Pittsburgh Steel's Oil Tempered Wire was a happy choice," said Mr. Pesaresi. "Its grain structure is right, it has a good surface, it's free from hard or soft spots and we can depend on it to hold uniformly to tensile strength specs."

• **Coiling Techniques**—Although Winamac Coil Spring has a hand-coiler matched by only three or four others in the country, Mr. Pesaresi found special techniques were needed to produce the balance spring with tight enough coils. To solve that problem, he designed and built a carriage and rollers that ride along the frame of the machine and guide wire on the mandrel. This device forces the wire being coiled tight against the wire just coiled. Exceptionally tight coils result.

• **Heat Treatment**—Coiling 21 feet

(Advertisement)

Balance spring is coiled on hand machine. It is equipped with a special carriage, designed and made at Winamac Coil Spring, which assures tight coiling.

Co-owner Walter Pesaresi examines finished balance spring, complete with plug which is inserted by customer who uses spring to support farm mower on tractor.

Winamac uses other Pittsburgh wire than oil tempered. Here are tiny springs, made from music wire, for use in valves of Air Force oxygen masks.

of .531 oil tempered wire into a 30-coil spring 16⅜ inches long produces heavy stress in the wire.

That's why stress-relieving is necessary to impart exactly the proper physical characteristics.

In the mowing machine spring, stress relief is especially important. The spring is subjected to continuous flexing and must be capable of supporting widely varying shock loads throughout its full range of adjustments.

After study and experimentation, Mr. Pesaresi found stress relieving coiled springs for 2½ hours at 500 degrees Fahrenheit provided just the right combination of time and temperature to give the springs long life in service.

• **Dependability**—Winamac Coil Spring has come to depend on Pittsburgh Steel for more than oil tempered wire.

Winamac uses music wire, supplied by the Johnson Steel & Wire Company subsidiary in Worcester, Mass., for automotive springs, appliance applications and for such uses as a valve spring for an Air Force oxygen mask. (Photo at left.)

"We found from actual experience," said Mr. Pesaresi, "that Johnson music wire was the only wire that held its dimensions uniformly."

Whether your operations call for oil tempered wire, some other type of manufacturers wire, or a fine wire specialty like Johnson's music wire, you'll find what you want at Pittsburgh Steel.

The fine, consistent quality of Pittsburgh wire holds down your production costs and builds customer satisfaction.

Trained Pittsburgh Steel engineers are readily available with counsel and wire know-how that will help solve your problems. You can get that help today by calling any of the Pittsburgh Steel district offices listed below.

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Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

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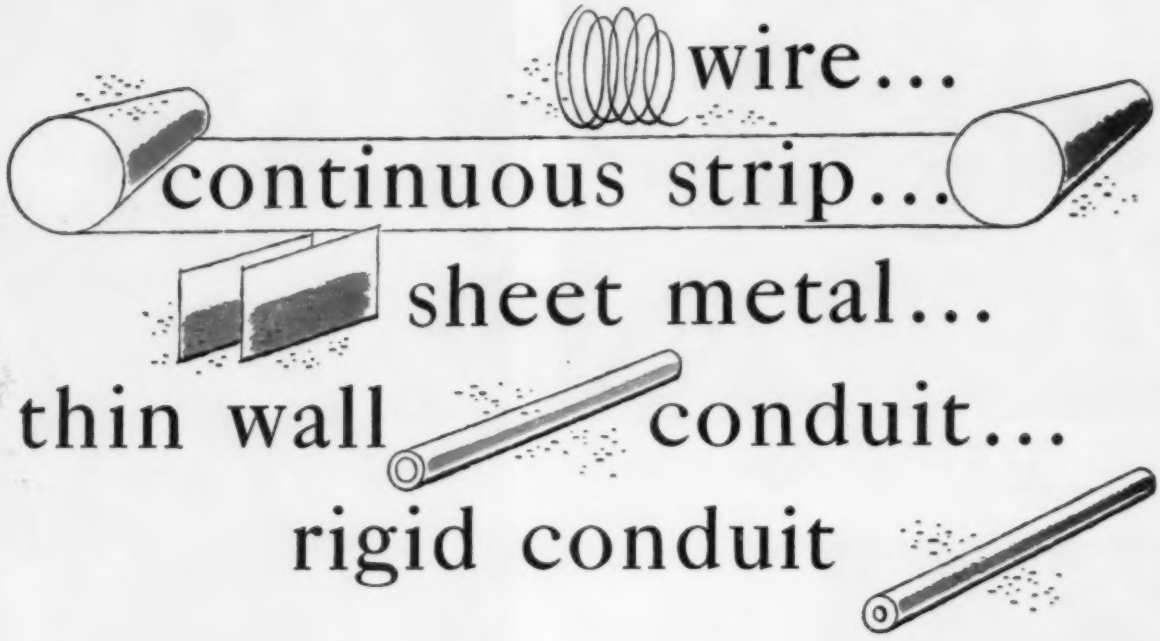

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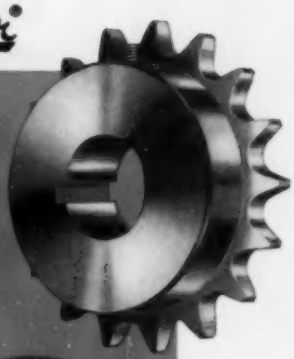
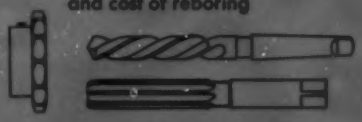
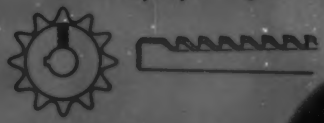


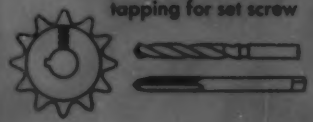
YOU SAVE time and cost of reboring



YOU SAVE time and cost of keyway cutting



YOU SAVE time and cost of drilling and tapping for set screw



YOU SAVE delay and cost of downtime in emergencies

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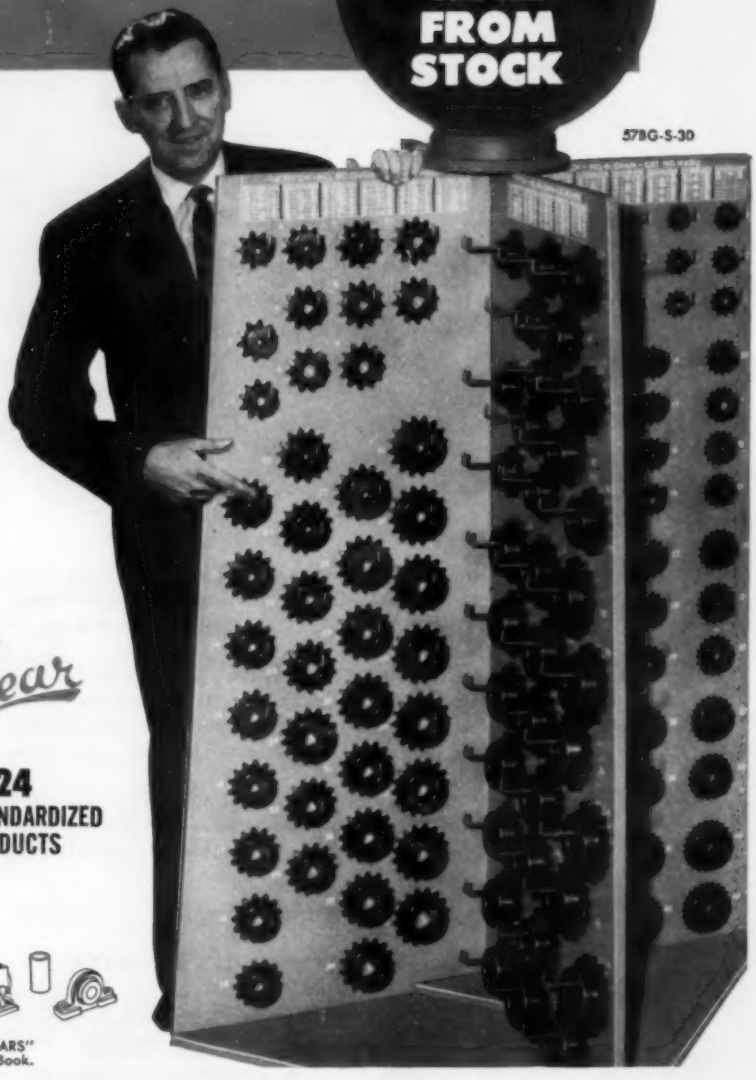

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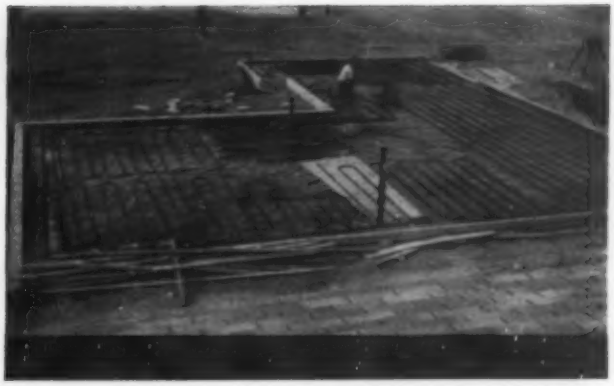
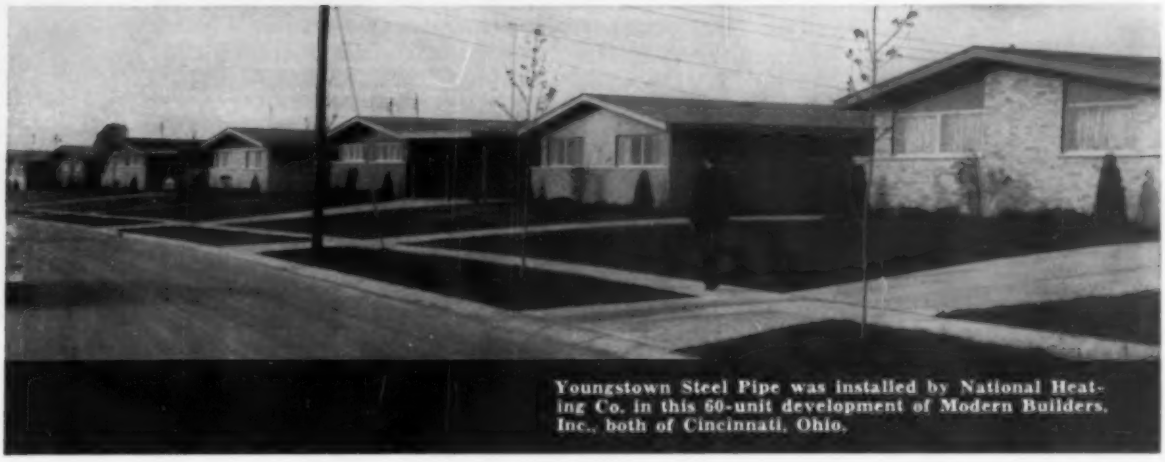


Youngstown steel pipe

. . . Gives Long, Maintenance-Free Life to Radiant Heating Installations



Youngstown Steel Pipe was installed by National Heating Co. in this 60-unit development of Modern Builders, Inc., both of Cincinnati, Ohio.

Specify Youngstown and secure these 7 Points of uniform goodness

uniform ductility
uniform lengths
uniform threading
uniform weldability
uniform wall thickness and size
uniform strength and toughness
uniform roundness and straightness

Modern residential developments—like this 60-unit project off Cincinnati's Winton Road—demand only the most modern heating facilities. So, to afford these new homeowners warm, draft-free rooms of equalized temperatures, invisible radiant heating systems utilizing Youngstown Steel Pipe were installed.

For years Youngstown Steel Pipe has been specified by leading architects as well as progressive plumbing and heating contractors for its dependability and long life. That's because it's made of only the finest steel by steelmen with over half-a-century of steelmaking knowhow. All Youngstown operations from ore mining to finish threading are closely quality-controlled to give you the best piece of pipe obtainable anywhere. Why not make Youngstown your specification for long, trouble-free installations?

For additional information or service, contact your local Youngstown distributor—or phone our nearest District Sales Office, today.

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THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
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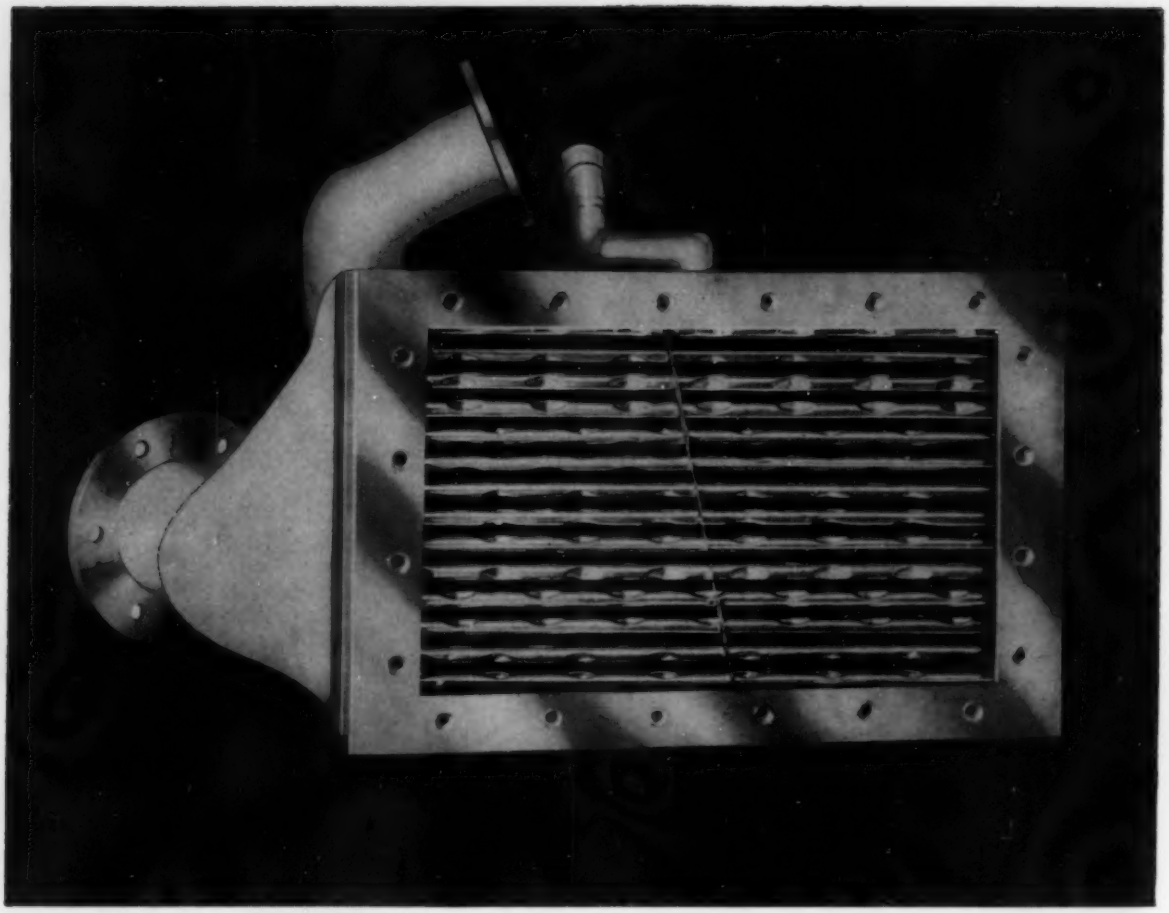

Heat Exchanger Unit for Aircraft by Southwind Division, Stewart Warner Corporation with BISHOP Tubing

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Yes, only the finest stainless steel tubing is good enough for today's aircraft. Stewart Warner's Southwind Division uses **Bishop** tubing in its heat exchanger units for airplanes . . . one of many uses to which aircraft parts manufacturers put **Bishop** small diameter tubing today.

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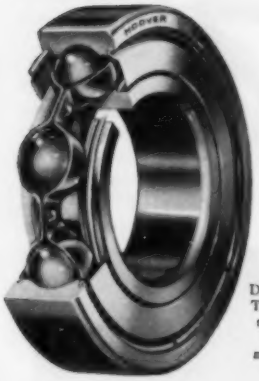
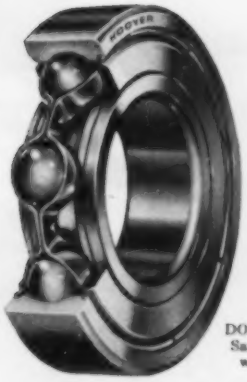
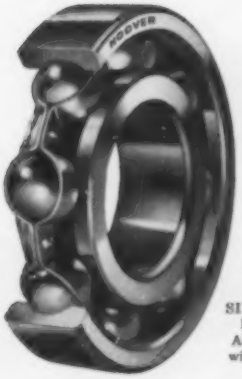


DOUBLE SEAL—
Teflon contact seal shown. Available with snap ring and with single or double seal.



DOUBLE SHIELD—
Same sizes available with single shield.



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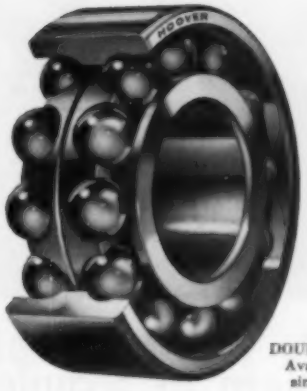
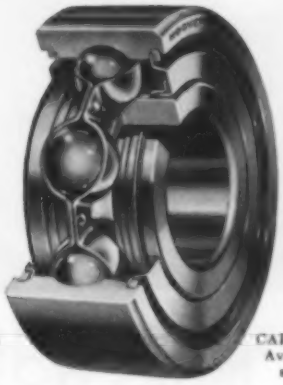


DOUBLE ROW—
Available with single shield.



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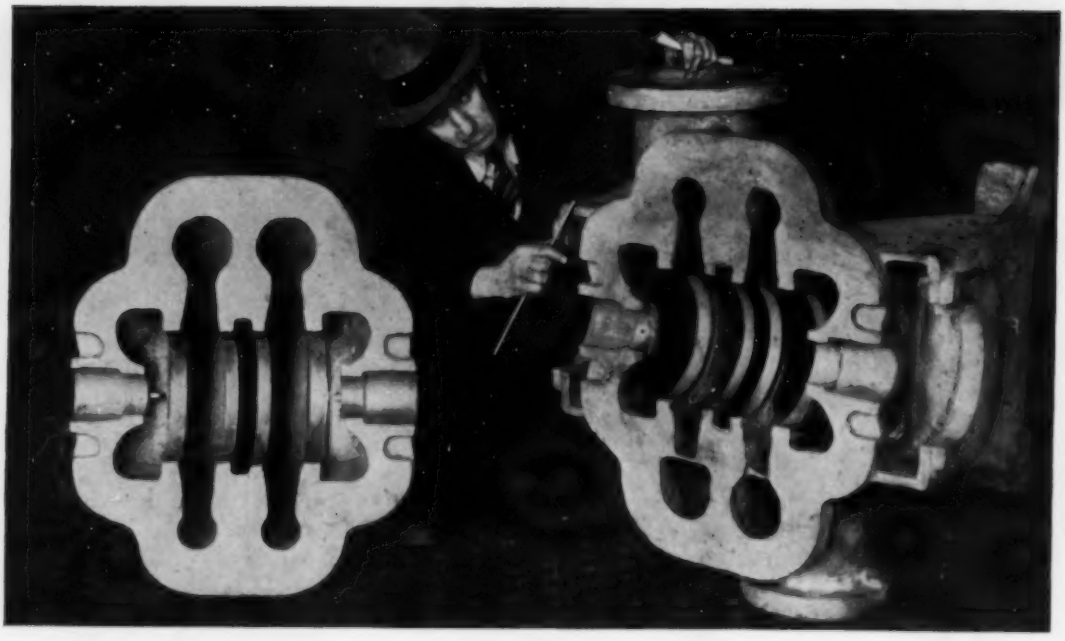

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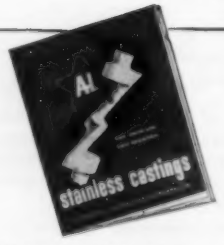

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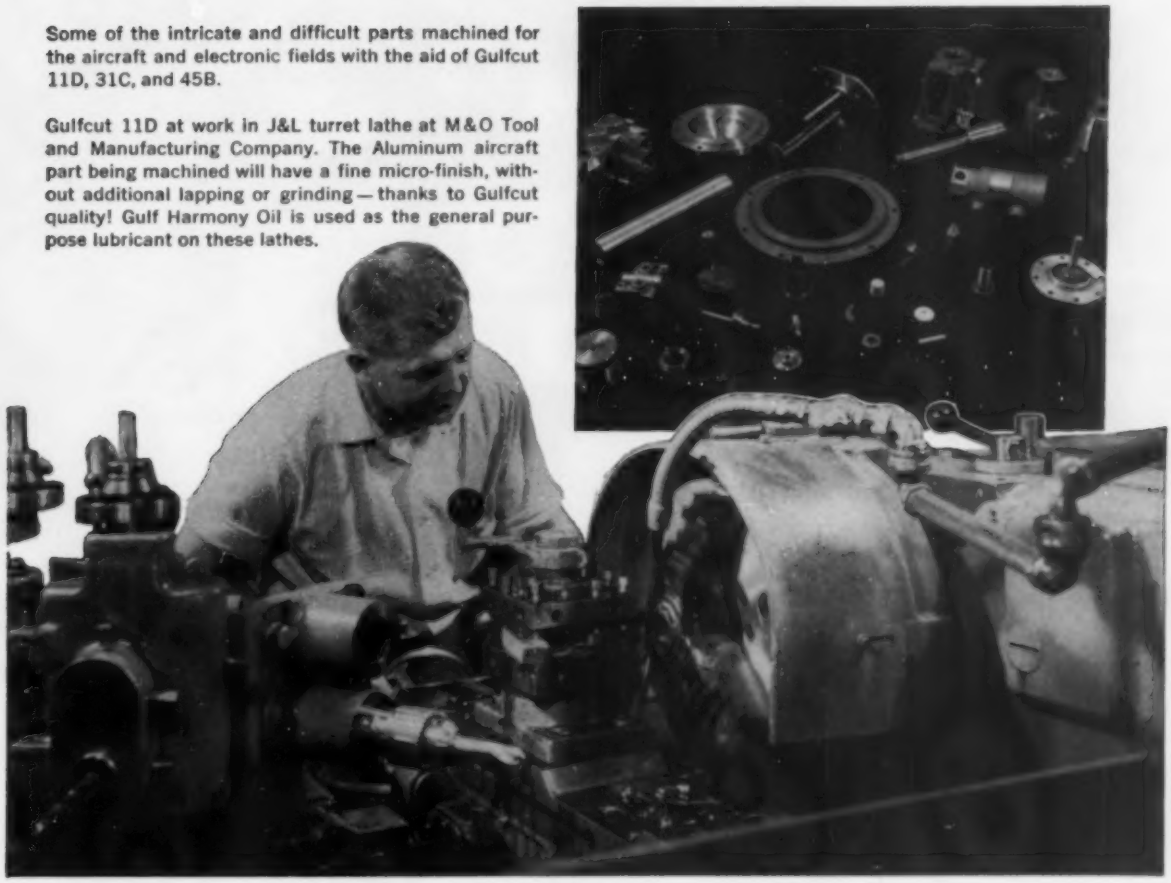
Some of the intricate and difficult parts machined for the aircraft and electronic fields with the aid of Gulfcut 11D, 31C, and 45B.

Gulfcut 11D at work in J&L turret lathe at M&O Tool and Manufacturing Company. The Aluminum aircraft part being machined will have a fine micro-finish, without additional lapping or grinding — thanks to Gulfcut quality! Gulf Harmony Oil is used as the general purpose lubricant on these lathes.



"We like the tough machining jobs ...and do them with GULFCUT"

says M&O Tool and Manufacturing Company, Wallingford, Connecticut

"We like the intricate, difficult jobs," says Mr. William E. Maseychik, owner. And Gulfcut helps us turn them out . . . on schedule. On our type of precision work, cutting oils must have more than just excellent cooling properties. They must have outstanding anti-weld characteristics, and extreme load-carrying ability. We've used Gulfcut Oils since the day we opened, because Gulfcut does everything we require."

M&O Tool and Manufacturing Company gets increased tool life by using Gulfcut . . . and less built-up edge. Gulfcut helps them maintain fine finishes to tolerances of five ten-thousandths. "We hold such tolerances consistently on our Jones & Lamson turret lathes," says Mr. Maseychik, "on aluminum, titanium, monel, inconel, SAE steels, many grades of stainless. Gulfcut certainly plays a major part in the quality of our machining!"

Why not investigate the benefits of Gulfcut cutting oils in your shop? Just call your Gulf Sales Engineer. He's at your nearest Gulf office, ready to serve *you!*

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Welding correspondent visits A. O. Smith

gets low-down on industry's most talked-about new development . . . views time-cost studies . . . comes up with revealing answer to question——

What about C-OMANUAL?

It's a complete, integrated package for gas-shielded (CO_2) semi-automatic hand gun welding.

Introduced to production early in 1956, C-OMANUAL is A. O. Smith's answer to the need for a fast, economical and easy-to-use semi-automatic welding process. It incorporates a new featherweight hand gun, portable control console and an A. O. Smith power source. The entire compact package requires only a few square feet of space and is perfectly adapted to an extremely wide range of production or special job requirements.

Already proving itself in plants throughout the U. S., C-OMANUAL is the most talked-about, most important welding development since the coated electrode. And the principles of CO_2 shielding have been more than adequately proved by C-OMATIC, the A. O. Smith automatic welding process.

Reporter observes typical C-OMANUAL installations as operator explains ease of hand gun manipulation featuring visible arc and automatic arc length control.

It's EXTREMELY EASY to set up, use and operate... makes changing wire sizes a breeze.

With C-OMANUAL, the welder merely sets the proper current on the rectifier, pushes a start button for power. The hand gun automatically compensates for arc distance variations, and the portable control console is right at hand for fine adjustments. There's no flux to clean, no slag to remove. And the visible arc lets the welder see his work at all times.

WIRE: A. O. Smith has developed wires that will make sound, strong welds on all commercial steels currently in use—rim, semi-killed or killed. The characteristics of the wire include tolerance for the presence of oils, lubricants, scale, foreign material, etc.

The console features easy-to-read, conveniently grouped controls. Large, easy-opening doors swing out for fast, simple wire reel changing. In demonstrations at various welding shows, welders were making highly satisfactory welds the first time they used the C-OMANUAL process.

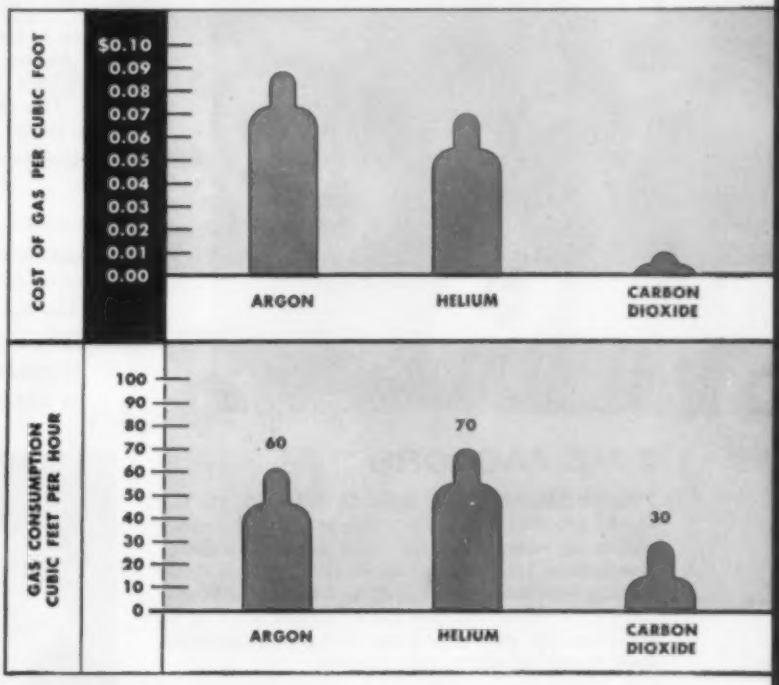
Carbon dioxide is the most efficient, economical of all shielding gases.

Lab tests, confirmed by numerous users, indicate radiographically sound welds with mechanical properties equal to the best produced by coated electrodes or by any other welding process. Tests were conducted on single, double and multi-pass butt welds . . . longitudinal, circumferential, positioned fillets and on plug and 3 o'clock welds. All were completely satisfactory.

And, as you can see in the charts at right, C-OMANUAL saves thousands of dollars annually over other shielding gases.

NOTE: On the following pages CO_2 welding is compared with hand electrodes and semi-automatic submerged arc. The charts above make it apparent that the high costs of Argon and Helium eliminate them from serious consideration for mild steel applications.

The C-OMANUAL wire feed driving mechanism is contained in the console and is easily accessible. The changing of wire reels and unit inspection is extremely simple. 60-lb. coils of any diameter are self-contained in the console. Special provision for economy "pay-off" packs can be made for large users.



Charts show comparative cost per cubic foot and relative consumption rates of Argon, Helium and Carbon Dioxide. Prices are based on standard-size cylinders. For users who'll want to use C-OMANUAL extensively, CO_2 in liquid form can be purchased in bulk storage tanks, converted to gas and piped into the job for less than half a cent per cubic foot.

SEE FOLLOWING PAGES FOR TIME AND COST COMPARISONS

A. O. SMITH CORPORATION, Milwaukee 1, Wisconsin

How C-OMANUAL three other

whatever your means of measuring welding costs, C-OMANUAL comes out on top

To spotlight the tremendous advantages offered by C-OMANUAL, A. O. Smith ran tests against submerged-arc (semi-automatic) process and the two types of stick electrodes usually used for jobs of this type. Box at right gives set-up information on tests. Data pertaining to "manual submerged-arc" in all following charts was compiled from manufacturers' operation manuals.

SET-UP DETAILS ON IDENTICAL ¼", 100-FT FILLET WELDS

	E-6013	E-6024	Manual Submerged-Arc	C-OMANUAL
Electrode	1/4"	7/32"	5/64"	1/16" CO-86
Amps*	320	250	350	520/530
Volts	22/23	23/24	32	40/41
Polarity	a-c	a-c	Reverse (+)	Reverse (+)

*Detailed explanation of amp variations involves the lengthy theory of C-OMANUAL's High Current Density method. It suffices here to say amps tabulated are estimated as normal ratings for the various processes on this particular job.

TRAVEL SPEEDS AND METAL DEPOSIT RATES

In addition to inherent speed, C-OMANUAL gives the operator a visible arc. He can fully utilize its high speed and fast metal deposit because he just pulls the trigger, follows the joint until the weld's complete. There's no need for stops to check his progress, no interruption when he moves from pass to pass.

Chart I

	E-6013	E-6024	Manual Submerged-Arc	C-OMANUAL
Travel Speed (ipm)	12.5	18.5	21.4	40.0
Deposit Rate (lbs/hr)	6.65	9.81	11.4	21.0

C-OMANUAL is 84% to 220% faster . . . deposits 87% to 216% more metal per hour than other processes

TIME FACTORS

Four factors combine to make C-OMANUAL the fastest process in its class. First, set-up and current setting are easy. Next, the hand gun automatically compensates for distance variations, eliminates time-wasting trial-and-error as well as false starts. Working with a visible arc, the operator need not stop to check how the weld is progressing. Last, but far from least, there's no slag to chip, no flux.

Chart II

Time (hrs.)	E-6013	E-6024	Manual Submerged-Arc	C-OMANUAL
Arc	1.590	1.080	0.930	0.500
Electrode Change	.075	.066	—	—
Slag Removal	.130	.084	0.120	—
Total	1.795 (1 hr, 40 min)	1.230 (1 hr, 15 min)	1.050 (1 hr, 3 min)	0.500 (30 min)

C-OMANUAL completes 100-ft weld 110% to 259% faster than other processes

stacks up against welding processes

COST FACTORS

The figures in the chart to the right have been compiled on the basis of the tabulations in charts I and II. All cost figures are based on an *exact* (by weight) ¼" fillet 100 ft in length. It's interesting to note that if the "overhead" or burden figure were increased, the advantage in favor of C-OMANUAL would become even more pronounced.

Cost	E-6013	E-6024	Manual Submerged-Arc	C-OMANUAL
Labor @ $2.50/hr.	4.49	3.08	2.63	1.25
Overhead @ 150%	6.74	4.62	3.95	1.88
Power @ .01/kwh	.14	.08	.17	.17
Flux	—	—	1.43	—
Gas (CO_2) @ .01/ft3	—	—	—	.15
Electrodes or Wire	2.09	2.86	1.38	3.09
Total	$13.46	$10.64	$9.56	$6.54

RESULT- based on charts I, II and III C-OMANUAL cuts total welding cost per 100 feet by 31% to 51%!

The Wire...

The most popular C-OMANUAL wire is CO-86 — an exclusive A. O. Smith development.

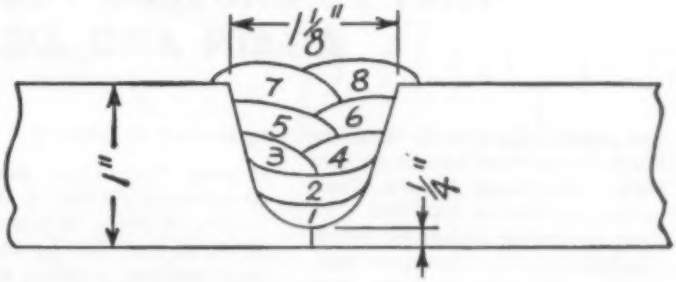
CO-86 produces a weldment with physicals comparable to those of the finest Low Hydrogen electrodes.

It has the ability to weld through oil and rust and can be successfully used on many off-chemistry and hard-to-weld steels. It will tolerate some high sulphur and high carbon steels.

Typical Mechanical Properties (as welded)

All-weld Metal Test Coupon - 1020 Steel

Beads 1 thru 6 — 36 volts — 395 amps
Beads 7 thru 8 — 38 volts — 390 amps



All Weld-Metal .505 Mechanical Tests

Yield Point (Drop of Beam)	Tensile Str.	Elong.	Red. of Area
57,850	73,300	31.5%	61.8%

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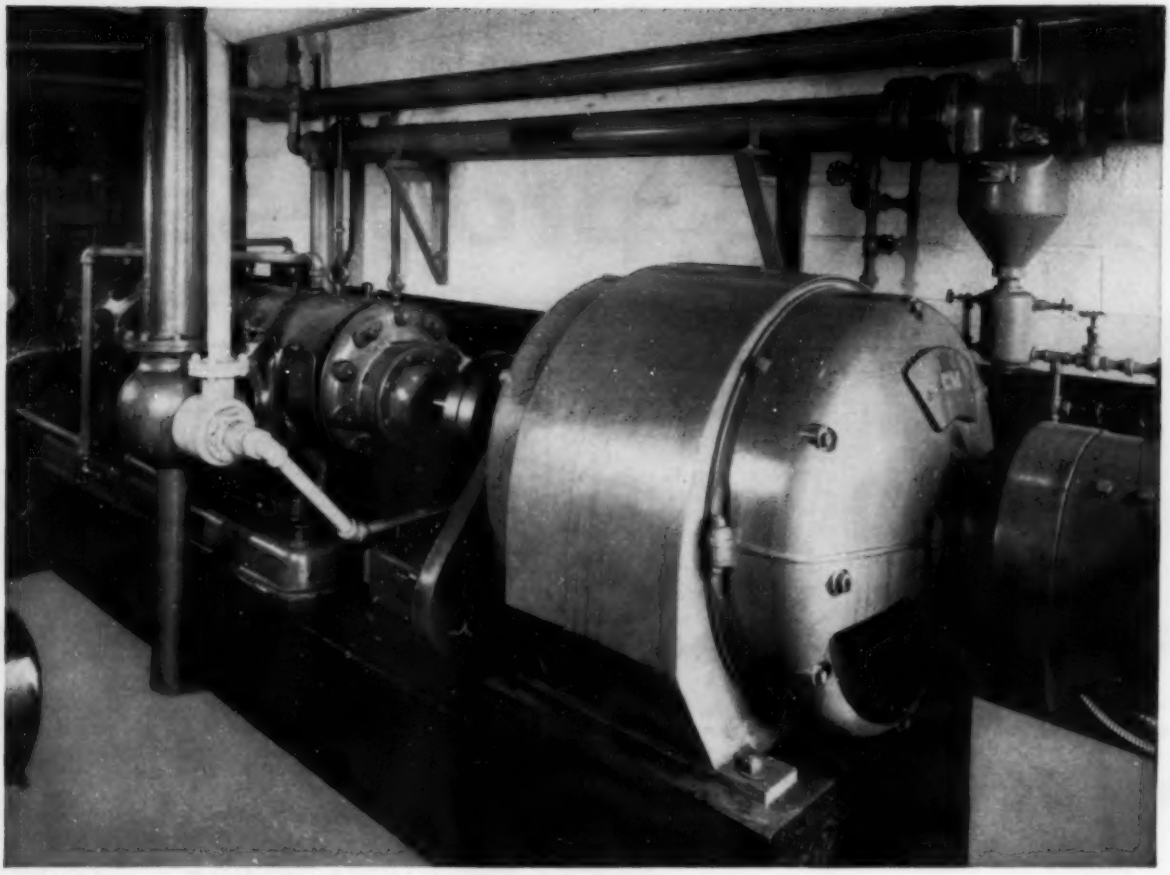

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. . . compactness and ease of installation, requires minimum space and light foundation

. . . vibrationless due to absence of reciprocating parts.

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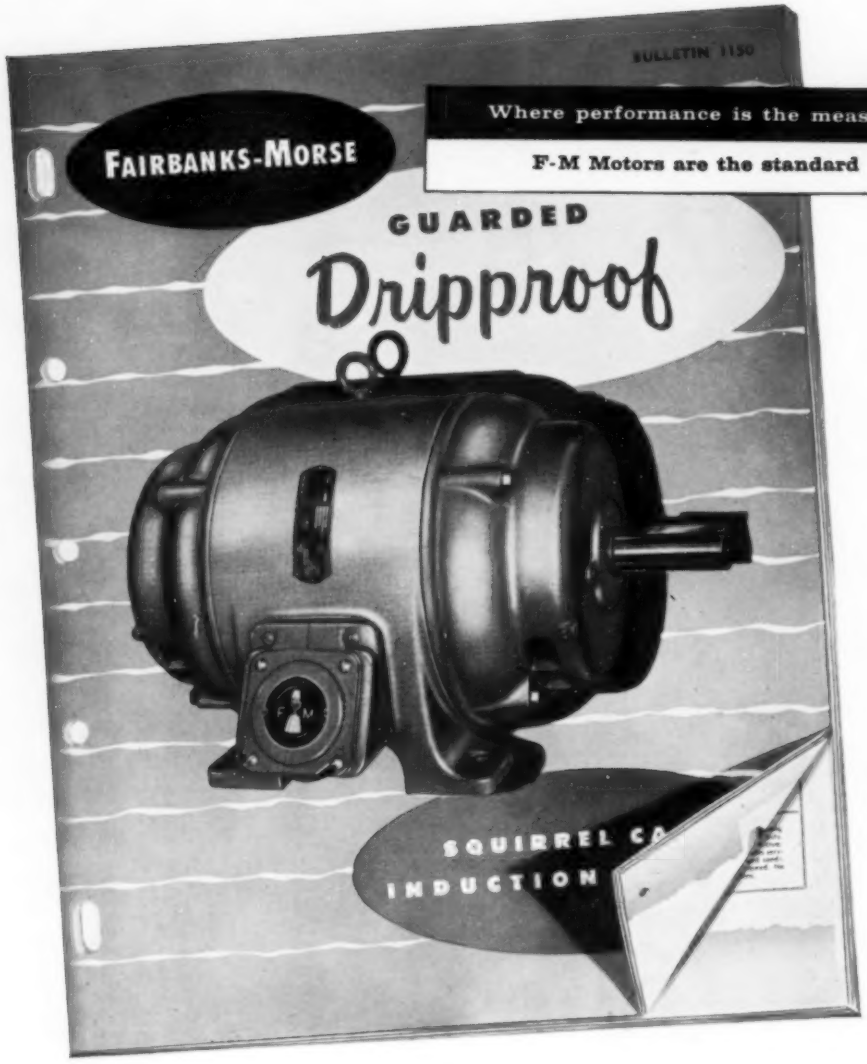

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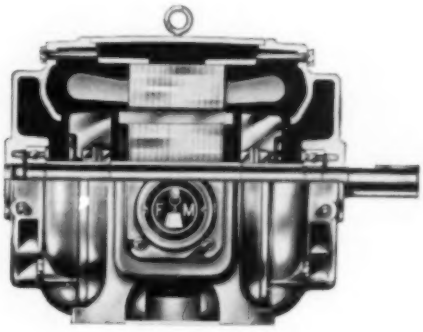

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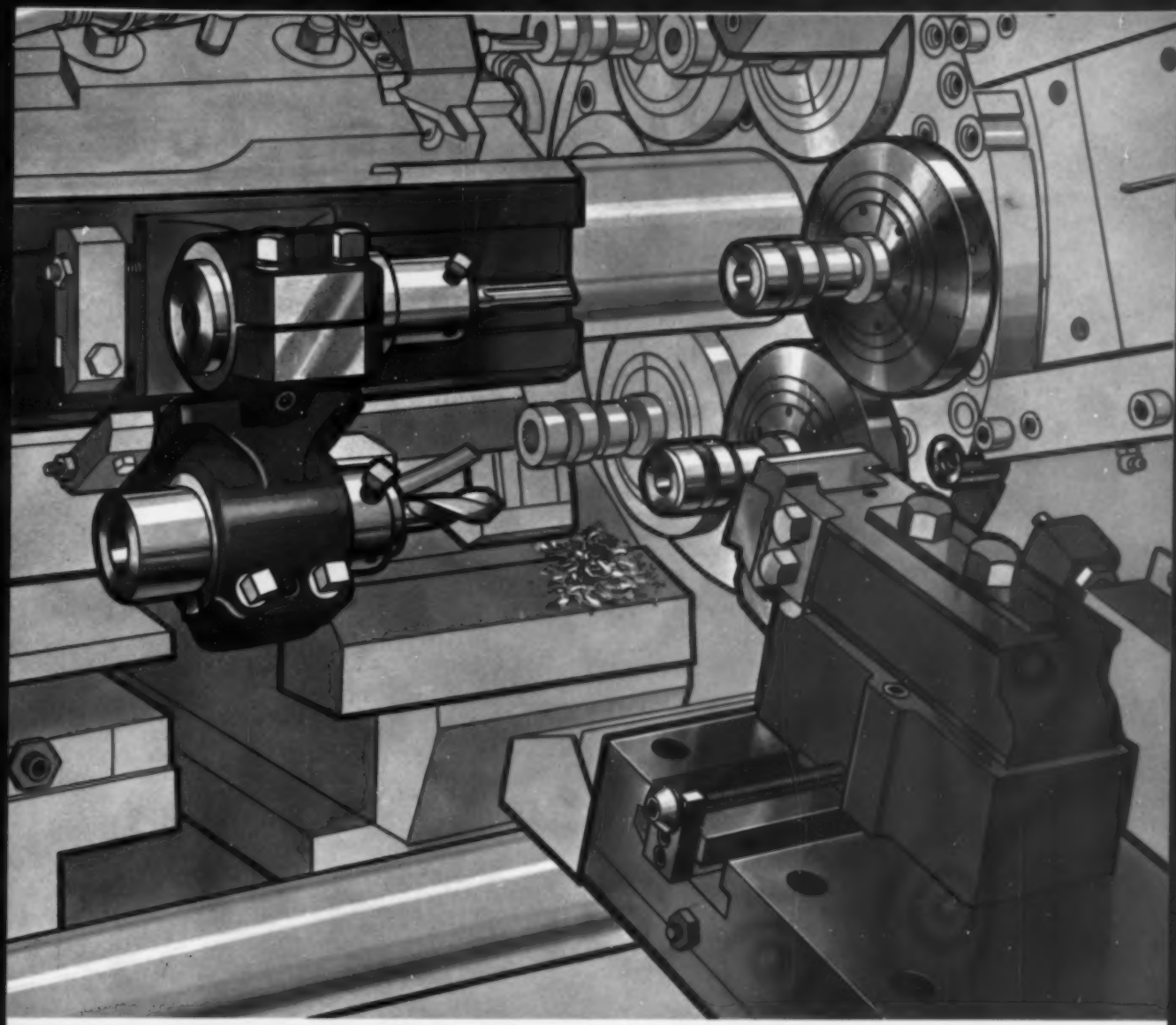

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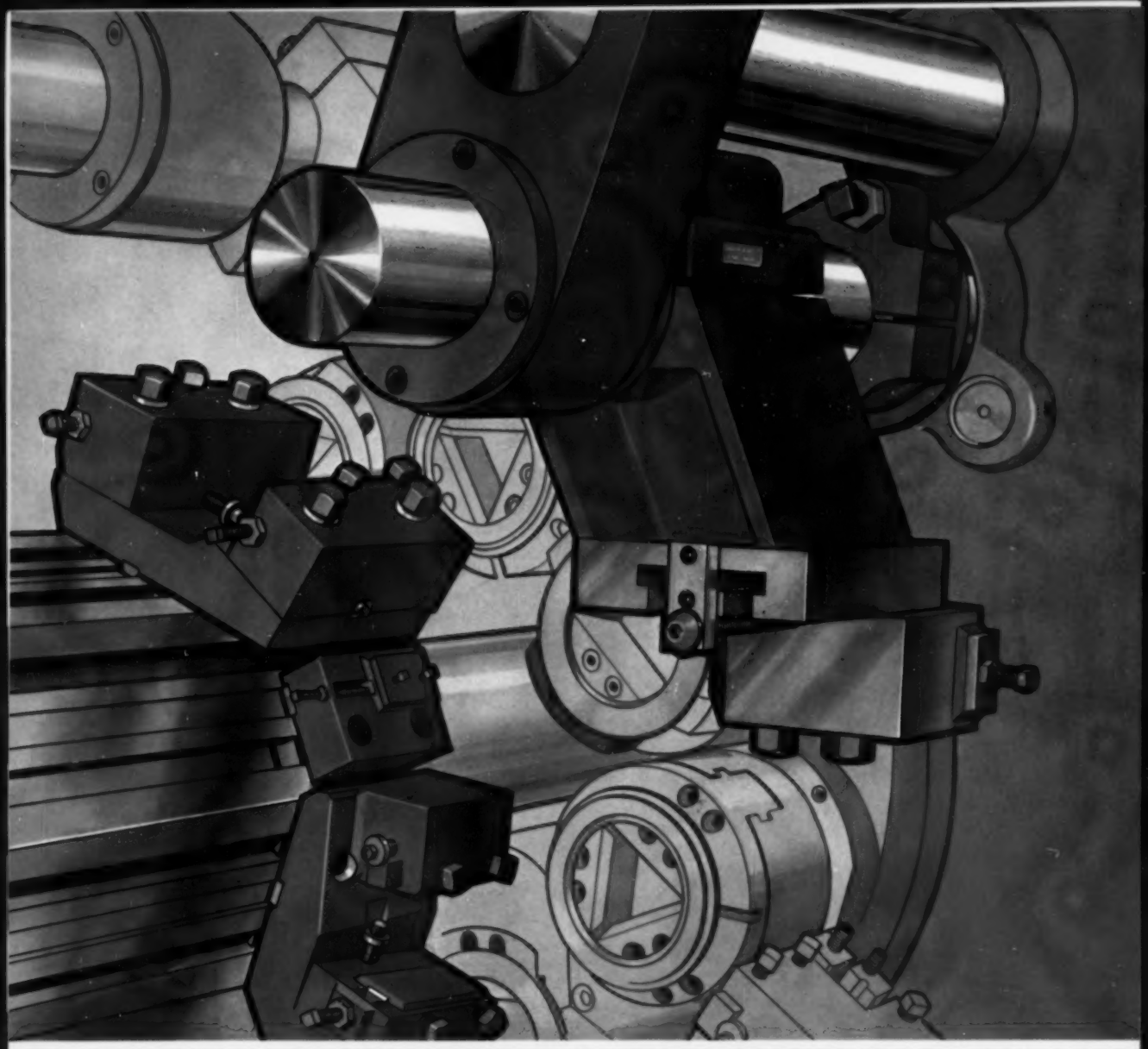
Automatic Bar Machine



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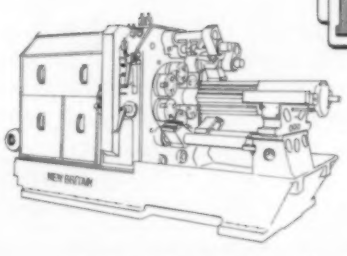

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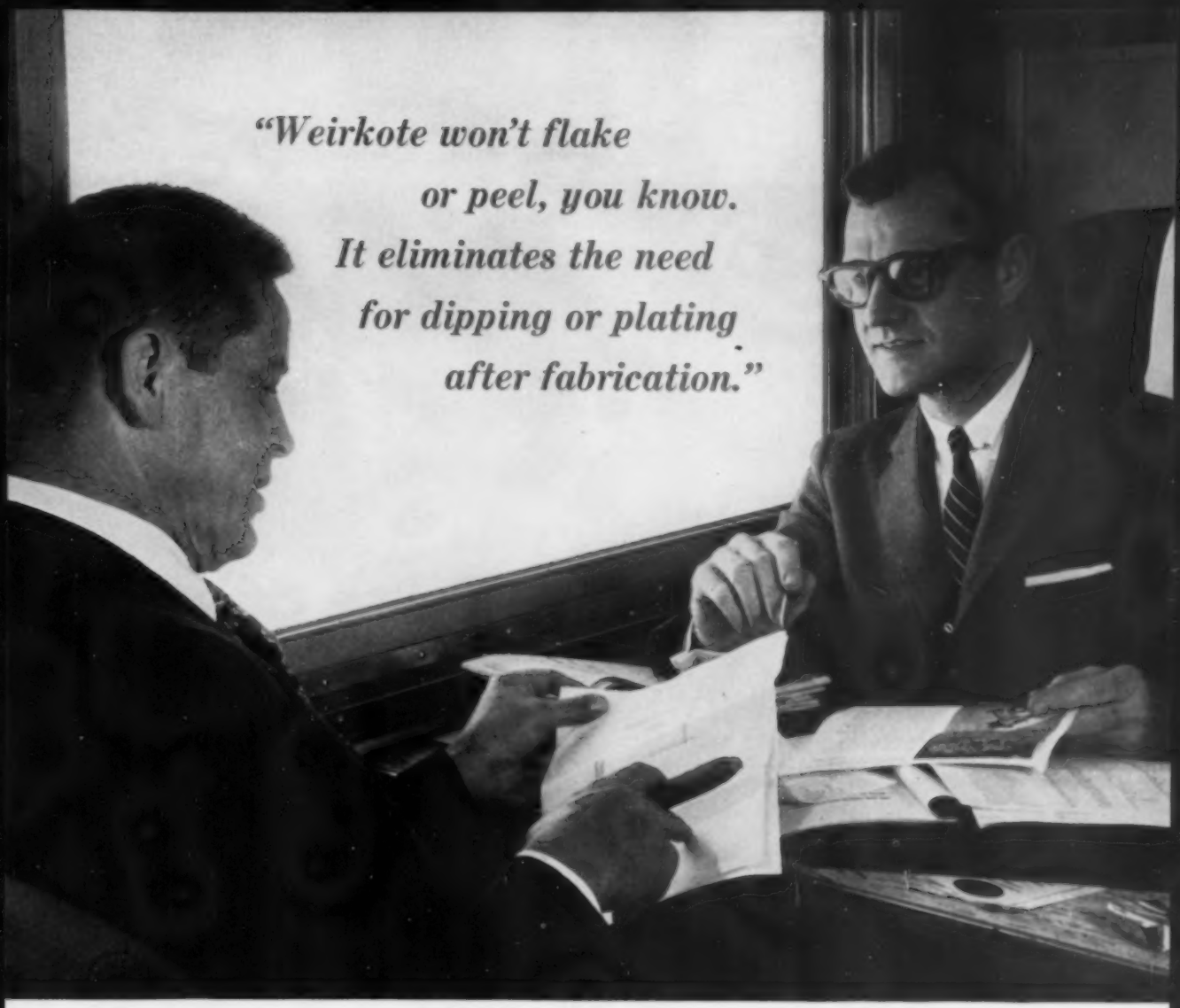

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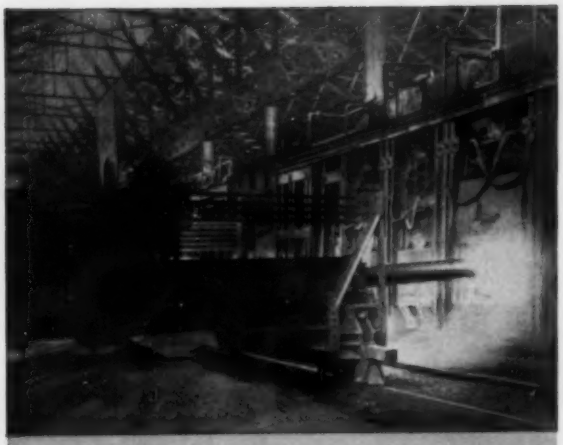

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. . . enables you to take on more jobs than you've ever been able to handle before. For Claymont maintains a 100,000 sq. ft. machine and fabricating shop right in its steel mill. This shop specializes in performing a wide variety of operations for fabricators—rolling . . . pressing . . . drilling . . . boring . . . milling . . . grinding . . . cutting . . . punching . . . welding . . . shearing. As a result, you can in effect supplement your own equipment with Claymont's extensive fabrication facilities. *And* you avoid paying freight and handling charges on that part of your plate that would only become scrap.

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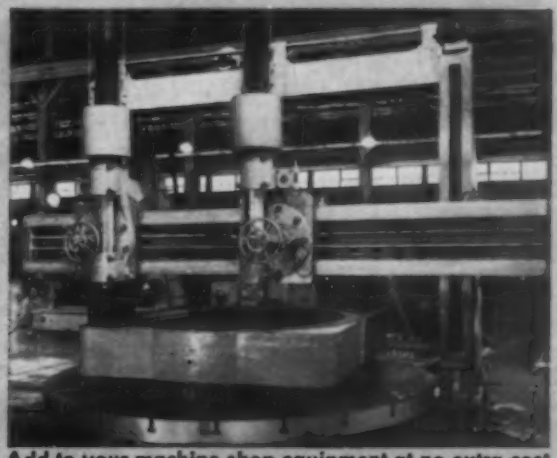

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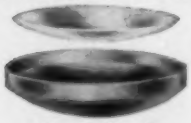

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Here's how you can help make stainless plate go a LONG way...

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1. If you have a D.O. rating, give it to your supplier—it helps him get the necessary nickel, and protects your position on his schedule.
2. If you are going to cut plate into smaller pieces, give your supplier the option of furnishing small pieces.
3. Plan ahead as much as possible, so your supplier has a reasonable chance to meet your delivery requirements.
4. If an alternate analysis or a slight variation in gage is acceptable, let your supplier know.
5. Buy "cut-to-shape" pieces and reduce your time and costs of handling scrap.
6. Clean out your stainless scrap so that it can get back into production.
7. Order only what you need in stainless plate—to exact size.

Put these simple rules to work . . . it will help you, and all of us, stretch the supply to the limit.

Stainless Steels Exclusively

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District Sales Offices in Principal Cities

MOVE 'EM WHILE THEY'RE HOT!

These smoking white hot slabs are on their way to conditioning. One of a dozen uses for the *Clark-Ross** Carrier in a mill. It's why we say the Carrier is a natural for the steel industry. It can *self*-load, deliver tremendous capacities, then *self*-unload. It's fast, flexible and saves working dollars. For example, Allegheny Ludlum's Brackenridge works is saving an estimated $11,000 annually in their Carrier-handling slab operation alone. In a plant, in a yard, over-the-road . . . the Carrier is rolling equipment that doesn't waste time standing while being loaded. Only 5 seconds to self-load . . . 3 seconds to self-unload. Take just a minute to call your local Clark dealer and ask for particulars concerning your operation. You'll be surprised at what the *Clark-Ross* Carrier can do for you.

Your local Clark dealer is listed in the Yellow Pages.

CLARK EQUIPMENT

*Clark-Ross is a Trademark of Clark Equipment Company

ROSS CARRIER DIVISION
CLARK EQUIPMENT COMPANY
Benton Harbor 26, Michigan

Hampton Roads VIRGINIA

Nation's first deep-water site

first choice for your plant

"Our shippes do lie so neare shoare that they are moored to the Trees in six fathom water." So wrote Master George Percy, one of Virginia's first colonists, who sailed into Hampton Roads in 1607. And today, this superb port still offers a choice of deepwater locations for your new plant.

Amoco, Nestle, Lipton and Dow are among the leaders who have recently chosen this key port-industrial area. The competitive advantages they find here can profit your new plant as well.

Top sea, land, air transportation link you with markets and sources of supply. You're central to the whole East, with favorable freight rates to the Mid-West. You have your choice of 9 main line railroads, 45 truck lines, 3 major airlines, and 300 shiplines.

Ample electricity at low cost flows from VEPCO's modern network. Capability is already 1,362,000 kilowatts—and will reach 2,000,000 kilowatts by 1959. Natural gas also serves our area.

Ask for full facts on mild living-and-working climate . . . young but conservative manpower . . . favorable taxes . . . fine educational, recreational facilities. And for confidential site-finding help, write or phone VEPCO, serving "The Top of the South."

SEE SIGHTS AND SITES!
Visit Jamestown Festival, April 1-Nov. 30, 1957. And while here, see some of Virginia's plant sites.

VIRGINIA ELECTRIC and POWER COMPANY
Clark P. Spellman, Director—Area Development
Electric Building, Richmond 9, Virginia • Phone: 86-1411

The FALK all-steel Shaft Mounted Drive

- *Versatile*
- *Efficient*
- *Economical*
- *Compact*

SIX SIZES—½ TO 30 HP—420 to 10 rpm—single and two double reduction ratios—output torque ratings up to 21,000 lb-in.

To Plant Engineers:

The versatility of the Falk Shaft Mounted Drive makes it the practical choice for many machines in your plant.

This compact unit mounts on the driven shaft, thereby solving many problems of restricted space. You can obtain almost any output speed between 420 and 10 rpm by selecting the proper single or double reduction unit and the proper sheave or sprocket ratio.

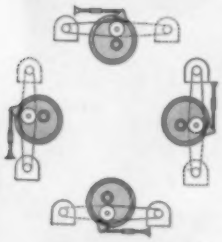
Do you need both horizontal and vertical drives? Standard Falk Shaft Mounted Drives are available for either application; or you can easily convert a horizontal unit to a vertical unit, right in your plant.

Initial cost is low, you get immediate delivery from shelf stock, and installation is quick and easy.

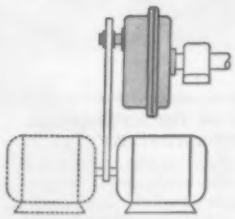
★

FALK Shaft Mounted Drives are available from factory and distributor stocks *from coast to coast.* See your Falk Representative or Distributor—or write direct for your copy of **Bulletin 7101.**

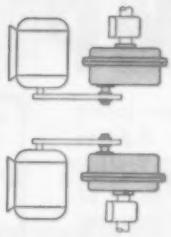
A few of the many ways this reducing unit can be applied—



ANY POSITION



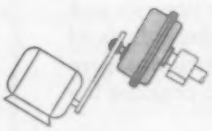
MOTOR EXTENDED
—or below the unit



VERTICAL—UP or DOWN

VARIABLE SPEEDS...
through use of variable-pitch sheaves—automatic belt adjustment with tie-rod adjustment

OVERLOAD RELEASE...
that will slacken belts and cut off power if overload occurs



INCLINED SHAFT...
Any standard unit can be mounted in vertical or inclined position by a simple rearrangement of oil drains

THE FALK CORPORATION, 3001 W. CANAL ST., MILWAUKEE 1, WIS.

Representatives and Distributors in Most Principal Cities

Manufacturers of

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

THE *IMPACT* STORY BEHIND THE PICTURES-

Four impact blows on three Cecostamps formed and blanked an aircraft instrument panel—ready for use!

FORMING—Pre-cut ⅛" aluminum stock was formed on two Cecostamps. The two pre-forming stages were worked simultaneously on one Cecostamp with one impact blow. The second Cecostamp did the final forming and setting in one impact blow. Note 90° flanges and 1½" step across center. No further trimming required.

BLANKING—Single impact blow of third Cecostamp accomplishes blanking of instrument holes. Bottom blanking die is made of zinc alloy using ½" thick chrome alloy plate backed by rubber in hole openings to eject slugs. Upper die has ¾" chrome alloy punches. Rubber, cemented around perimeter strips panel from die. Only ⅛" landing between some of the holes—and approximately 225 lineal inches are sheared!

This job is a unique Cecostamp achievement!

JOBS LIKE THIS PROVE THE VALUE OF THE *IMPACT* OF A

CECOSTAMP

The Cecostamp's controlled *impact* blow forms and sets the metal to exact dimensions. Add to this important feature Cecostamp's flexibility for handling a complexity of forms, its simplicity of tooling, its low operating cost and safety features and you will appreciate why Cecostamp is the modern forming tool for today's and tomorrow's metal shop requirements. The Cecostamp incorporates easier operation and greater strength and power, in anticipation of the tougher alloys of heavier sections and larger units which are more and more in demand. You'll want to consider the Cecostamp for your shop.

Send for Bulletin 30-L-5.

SOME OF THE ADVANTAGES OF THE CECOSTAMP

1. *Sets sharp changes of contour to permanent shape*
2. *Produces components within strict dimensional limits*
3. *Shearing can be combined with stamping of simple shapes*
4. *Skillful operators can develop and form many shapes difficult to form on any other type of press*
5. *Controlled blow is well suited to forming large integral parts*
6. *Low tooling cost and rapidity of die fabrication*

CECOSTAMP

CHAMBERSBURG ENGINEERING CO.

Builders of THE IMPACTER

"FORGING IN MID-AIR"

CHAMBERSBURG, PENNSYLVANIA

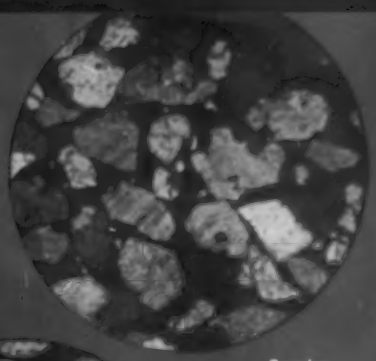
NEW in toughness

NEW in cutting action

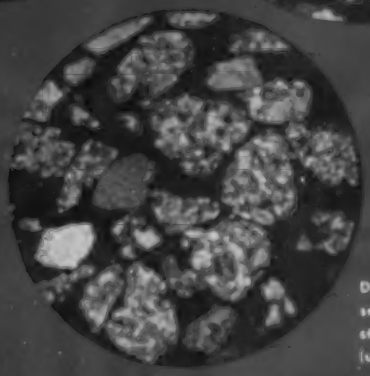
NEW in grinding economy

NEW LIFE

for more grinding . . .



Regular Aluminum Oxide (unretouched)



DA Borolon smaller crystal structure (unretouched)

NEW

SIMONDS ABRASIVE CO.

DA Borolon® TRADE MARK

for resinoid bonded snagging wheels

A big forward step to new efficiency in grinding steel mill billets and foundry castings. Note the smaller crystalline structure of DA Borolon within each abrasive cutting particle! This means inherent toughness to resist fracture during grinding stress . . . more and sharper cutting edges on the wheel face . . . longer, useful wheel life . . . and more production per wheel dollar. Test after test on swing frames, floor stands and portables prove that Simonds wheels with this new aluminum oxide abrasive belong on your grinders for more production at lower cost. Write for descriptive bulletin.

CALL YOUR SIMONDS DISTRIBUTOR

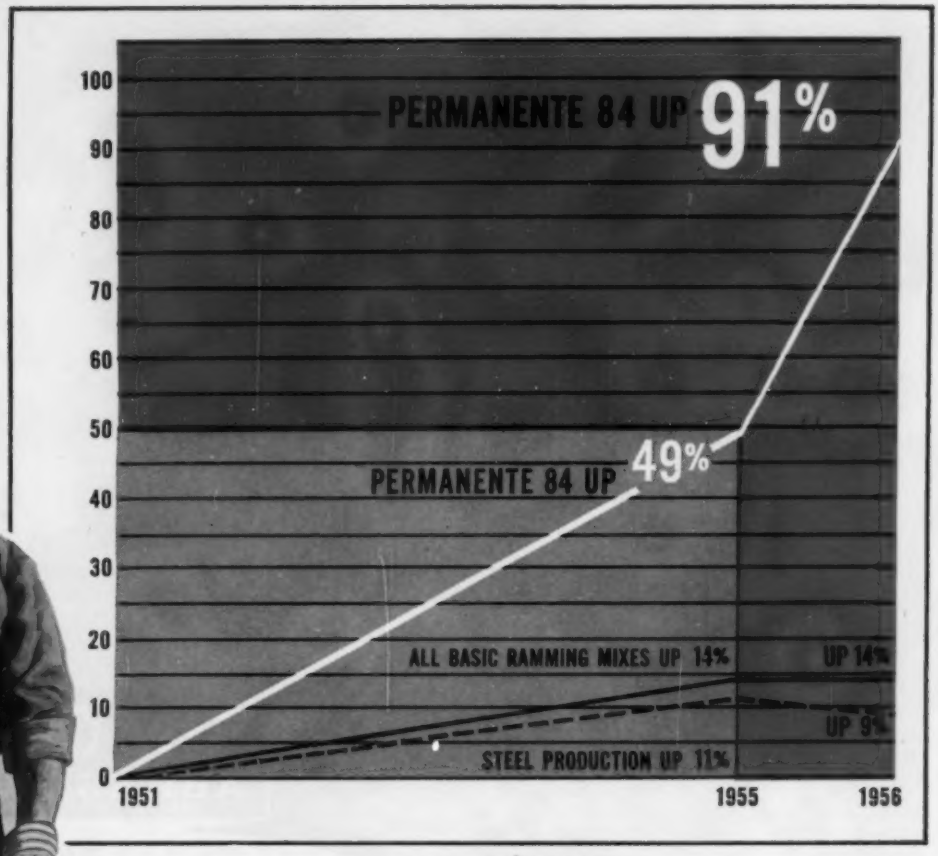
LOCAL STOCK FAST SERVICE

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCHES: PHILADELPHIA, CHICAGO, DETROIT, LOS ANGELES, SAN FRANCISCO, PORTLAND, ORE.



Why this ~~growing~~ *soaring* preference for Permanente 84 Ramming Mix?

A year ago, we ran an ad showing how sales of Permanente 84 to steel producers had increased 49% during the same 5-year period that sales of all basic ramming mixes increased only 14%.

But now after just one more year, steel producers' preference for Permanente 84 has pushed its sales increase up to *a whopping 91%!*

Why such an overwhelming preference? Briefly, here are the reasons:

Permanente 84 reduces the cost of maintaining furnace bottoms and banks. Repairs made with Permanente 84 stay put! Down time for hot repairs is reduced. Steel production goes up—costs come down. Ideal for hot patching both open hearths and electric furnace banks and bottoms.

Order Permanente 84 now and get extra steel tonnage at lower cost.

Call or write Kaiser Chemicals Division, Dept. R7242, Kaiser Aluminum & Chemical Sales, Inc., at any of the addresses listed below:
PITTSBURGH 22, PA. . . . 3 Gateway Center
HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

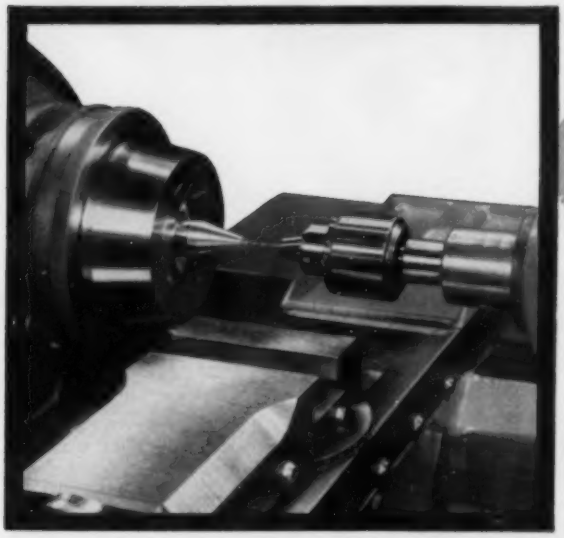
KAISER REFRACTORIES

Kaiser Chemicals

Pioneers in Modern Basic Refractories

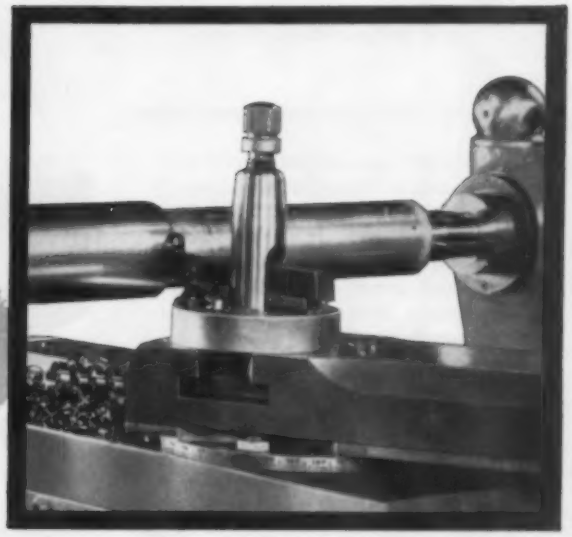
Refractory Brick and Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite

Rivett's 2 for 1 Lathe!



Sensitive...
As An Instrument Lathe

Responds to the lightest touch of the operator. Turns within .0004" in 12" length!



POWERFUL...
As An Engine Lathe

Full horsepower transmitted to spindle. Takes ¼" chip with .020" feed on cold rolled steel.

Model 1020S "Steelway"
PRECISION TOOLROOM LATHE

This lathe has the industry talking! Because of extreme precision, it has long been recognized as the top tool by master mechanics. Now, its adaptability and broad usefulness have highlighted its productivity. As one satisfied user states, "Our toolmakers go to a Rivett first in preference to our other lathes!"

RIVETT LATHE & GRINDER, INC.
Dept. ST-4, Brighton 35, Boston, Mass.

Go to Rivett now for information about this big, beautiful machine.
Send for bulletin 1020B.

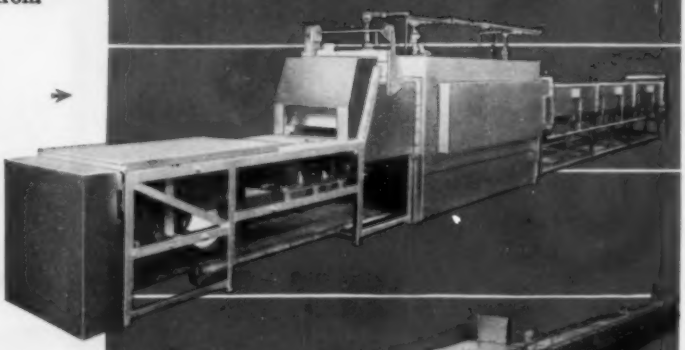
RIVETT
"Steelway" Lathes

Look to Lindberg for Sintering Furnaces

For sintering furnaces, just as in all types of industrial heating equipment, you can depend on Lindberg's ability to supply exactly the right equipment for your needs. Here are some typical Lindberg sintering furnaces:

This Hand Pusher Batch Type Furnace

is used for small production lots and experimental sintering. It is an all-purpose unit for operation from 1300°F to 2500°F. Made in various sizes for sintering from 25 to 300 pounds per hour.



This Mesh Belt Continuous Type Furnace

is a popular sintering furnace for small light parts in copper, bronze, brass or steel with a temperature range from 1300°F. to 2100°F. It can be used for low temperature silver brazing, bright annealing, as well as sintering of powder metals. Production ranges up to 500 pounds per hour.

This Roller Hearth Continuous Type Furnace

is especially designed to handle heavier loads up to 2200 pounds per hour. It has an effective temperature range from 1300°F. to 2100°F. It can be used for bright annealing, low temperature silver brazing as well as sintering of powder metals.

Atmosphere Generators

To obtain the best work from any sintering furnaces, the proper atmosphere is required. The atmosphere generators described here provide the proper atmospheres recommended for use with Lindberg Sintering Furnaces.

1. The HYEX Generator produces atmosphere composed of approximately 4% carbon dioxide—18% hydrogen—12% carbon monoxide and 66% nitrogen.

2. The HYEN Generator produces a neutral atmosphere composed of approximately 21% carbon monoxide—40% hydrogen—38% nitrogen and 1% methane.

3. The HYAM Generator produces atmosphere composed of approximately 75% hydrogen and 25% nitrogen.

If you have a sintering or brazing problem why not talk it over with Lindberg. Just get in touch with your nearest Lindberg Field Representative or write us direct.

LINDBERG

ENGINEERING COMPANY

Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Cal.

2441 W. HUBBARD ST., CHICAGO 12, ILL.

YOUR GUIDE TO COLUMBIA HOT WORK TOOL STEEL GRADES

TYPE AND GRADES	DESCRIPTION	HARDENING RANGE	QUENCH	TEMPERING RANGE	USEFUL HARDNESS
T1 — CLARITE HW	Full tungsten hot work steel with modified carbon and vanadium for highest resistance to softening at elevated temperatures with best wear resistance and medium toughness.	2100° F. to 2250° F.	Oil or Salt Bath	1050° F. to 1250° F.	58/52 Rc
H24 — FORMITE NO. 3	A high tungsten hot work steel with good heat resistance to softening and wear, good toughness.	2000° F. to 2200° F.	Oil or Air	1050° F. to 1250° F.	56/48 Rc
H21 — FORMITE NO. 2	Reduced tungsten hot work steel with good resistance to softening and wear and high toughness.	2000° F. to 2200° F.	Oil or Air	1100° F. to 1250° F.	54/42 Rc
M10 — MOLITE HW10	A high molybdenum 2% vanadium steel with modified carbon for high resistance to softening and good wear resistance with high toughness.	1800° F. to 2100° F.	Oil or Air	1100° F. to 1250° F.	56/48 Rc
H13 — VANADIUM FIREDIE	Air hardening chromium molybdenum 1% vanadium for die casting aluminum, may be water cooled.	1825° F. to 1900° F.	Air	1000° F. to 1200° F.	52/38 Rc
H12 — ALCODIE	Chromium molybdenum tungsten vanadium air hardening hot work steel, resists softening with good resistance to wear and heat checking	1825° F. to 1875° F.	Air	1000° F. to 1200° F.	52/38 Rc
H11 — FIREDIE	Chromium molybdenum with 1/2 % vanadium air hardening type with widest range of uses, good resistance to softening and wear with high toughness and may be water cooled.	1800° F. to 1850° F.	Air	1000° F. to 1200° F.	52/38 Rc

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILLINOIS

CENTRAL OFFICE AND WORKS, CHICAGO HEIGHTS, ILLINOIS — BRANCH STOCKS IN THE FOLLOWING CITIES:

Chicago 32 — 4832 S. Kedzie Ave. — Phone LAfayette 3-3632
Cincinnati 25 — 2716 Spring Grove Ave. — Phone MUlberry 1-8400
Cleveland 14 — 1640 St. Clair Ave. — Phone MAin 1-1785
Detroit 3 — 121 Oakman Blvd. — Phone TUlse 3-3770
Los Angeles 22 — 6955 E. Bandini Blvd. — Phone RAymond 3-4684
Milwaukee 4 — 426 S. Sixth St. — Phone BRoadway 6-0255
St. Louis 13 — 5118 Easton Ave. — Phone FOrest 1-0641

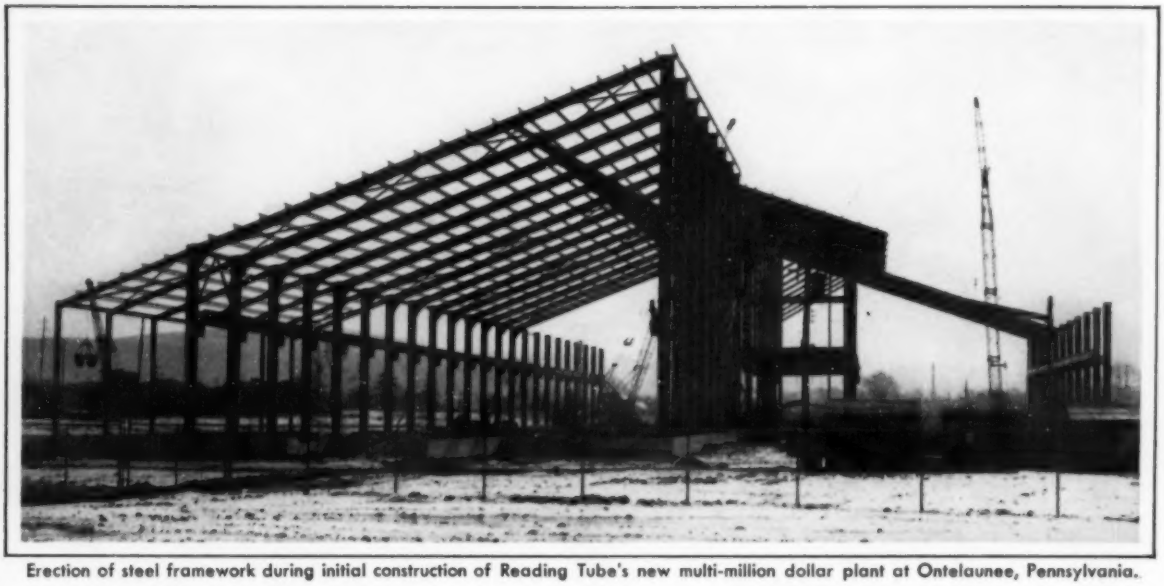
REPRESENTATIVES IN THE FOLLOWING CITIES: Dayton, Erie, Grand Rapids, Hartford, Indianapolis, Louisville, Moline, Newark, Portland and St. Paul

1957

TOOL COLUMBIA STEELS

COLUMBIA TOOL STEELS

DIE STEELS: Superdie — Atmodie — E-Z-Die Smoothcut — Exl-Die — CEC Smoothcut CARBON TOOL STEELS: Columbia Special — Vanadium Extra — Waterdie Extra — Columbia Extra — Columbia Extra Headerdie — Vanadium Standard — Colmbia Standard HIGH SPEED STEELS: Clarite — Vanite — Acmite — Cobite — Maxite — Molite Smoothcut — Molite #3



Erection of steel framework during initial construction of Reading Tube's new multi-million dollar plant at Ontelaunee, Pennsylvania.

THERE MUST BE A REASON...

Reading Tube Corporation is building its new 96,000 sq. ft. casting and fabricating plant

IN PENNSYLVANIA

"Our company is indeed familiar with Pennsylvania," says Mr. Martin Mack, President of Reading Tube Corporation, "since virtually our entire history of copper and brass tubing manufacture has been written in Reading, Pennsylvania. During the five years prior to 1956, our sales grew from $11,000,000 to more than double that figure, thereby requiring frequent expansion of our facilities. We consistently chose to grow in Pennsylvania because of the Keystone State's manifold advantages for industry:

1. "Pennsylvania is located in the heart of industrial America.
2. "In Pennsylvania and her neighboring states, we find an abundant and reliable supply of materials vital to our operation.
3. "Reading Tube, in common with other Pennsylvania companies, enjoys the services of a highly skilled and intelligent labor force.
4. "Not least important is the warm welcome Pennsylvania communities have for industry. We have been made to feel 'at home' in the Reading area.

"All these factors were considered in planning our latest expansion. This, our second plant, situated on a 95-acre site close to our present location, promises to add substantially to the company's sales and earnings potential. It also represents employment opportunities for about 400 men and women, and another step forward in the planned growth of Reading Tube Corporation."

Your company can benefit by these and similar advantages offered in many Pennsylvania communities. For free copy of "Plant Location Services" booklet, or for details on how the PENNSYLVANIA PLAN *can provide* 100% *financing for your new plant, write or call:*

Pennsylvania Department of Commerce
Main Capitol Building, 561 State Street
Harrisburg, Pennsylvania
Phone: CEdar 4-2912

Special reports and tabulations, tailored to your specific location requirements, will be prepared upon request by engineering and economics specialists, covering:

Labor—Availability, skills, rates, surplus areas.

Markets—Consumer, industrial product, state, regional.

Transportation—Water, rail, truck, air transit time, costs.

Buildings—Availability, sizes, location, descriptions.

Sites—Acreage, topography, utility services, photos, maps; industrial districts.

Financing—Community-state industrial building program, lease-purchase, commercial credit.

Materials—Metals, industrial chemicals, wood, textiles, farm products.

Minerals—Location, reserves, potentials, analyses.

Water—Quantitative, qualitative analyses.

Power—Capacity, network, industrial services, costs.

Fuel—Coal, oil, natural gas service, costs.

Engineering—Schools, enrollment, specialization, research laboratories, services.

Taxes—Inter-state and community comparisons, assessment ratios, millages, corporate.

Communities—Characteristics, size, regions, housing, schools, culture, recreation.

Industrial Representatives Available for Inspection Tours, Conferences and Consultations

Inland Ledloy*...the original leaded steels

It is not by chance that Inland Ledloy steels have set the standards with which all other free machining steels are compared. Almost twenty years have passed since Inland started a metal-working revolution with its discovery of how to add lead to steel . . . years in which Inland has refined and developed its techniques and gained the practical daily production experience that has made Inland world leader in the production of fine leaded steels.

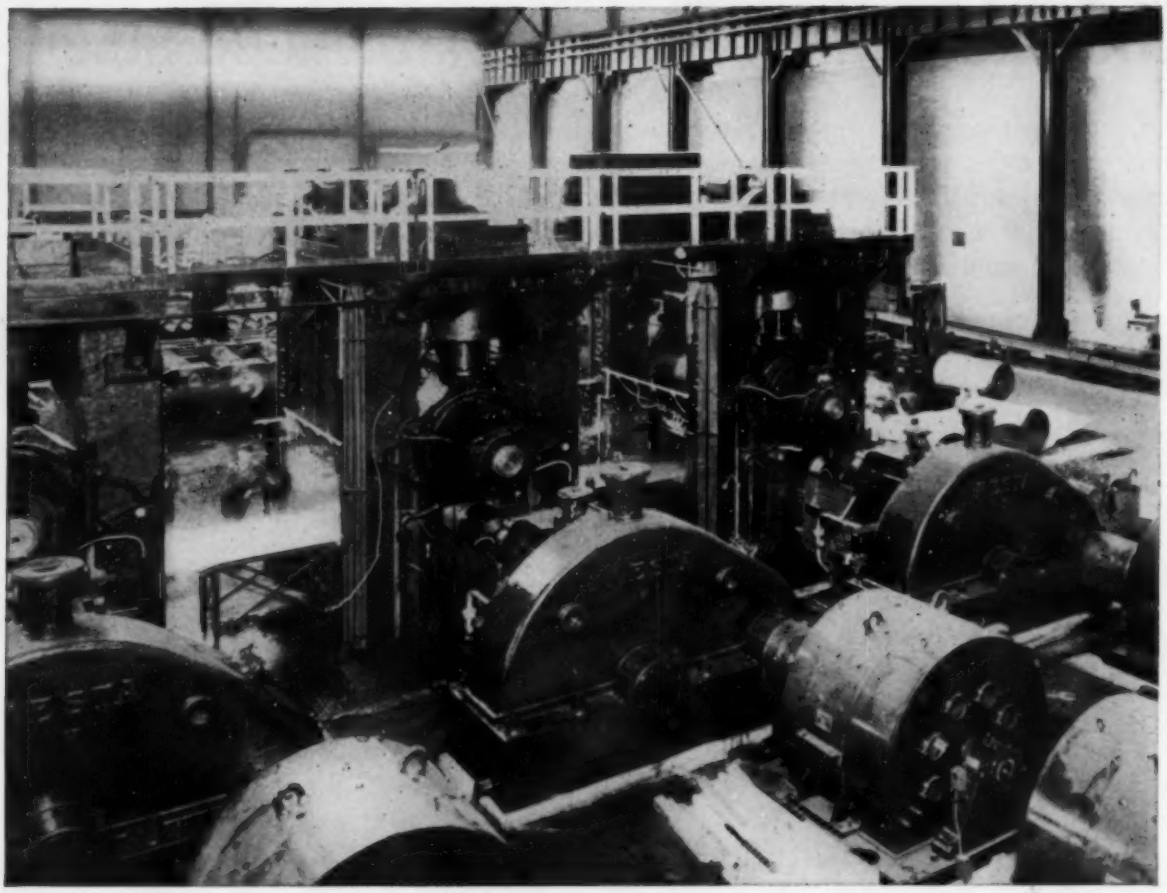
Here, two members of Inland's experimental production team are literally helping to make steel history—producing the world's first heat of leaded steel in a standard open hearth furnace. Even after the addition of lead to steel had been mastered in laboratory-sized furnaces, many months of experimentation were required to learn how to translate this "test tube" experience into commercial production.

Inland's research and production men learned the secrets of making Ledloy the hard way. But this has given to Inland the kind of experience in the making of leaded steels that is unequaled and has made Ledloy steels the world's most machinable.

Experience makes Inland Ledloy better

INLAND LEDLOY is sold in cold drawn form, under various trade names, by leading cold drawers and steel warehouses from coast to coast.

***INLAND STEEL COMPANY** 38 South Dearborn Street • Chicago, Illinois Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York • *registered trade name of Inland Steel Company, pioneer in the development of leaded steels.*



PROTECT REDUCTION GEARS

against Heaviest Loads

It's the polar additives in *Texaco Meropa Lubricant* that *keep* it clinging to gear teeth and bearing surfaces even when gears are working under severe conditions of heat, pressure, or moisture.

What's more, the extreme pressure properties of *Texaco Meropa* give it a tougher, longer lasting lubricating film that effectively protects against shock or heavy steady loads. And it resists oxidation and thickening—won't foam or separate. All good reasons why gears run smoother, last longer, and maintenance costs stay low.

There is a complete line of Texaco Lubricants designed to help you get the most efficient performance from your equipment. A Texaco Lubrication Engineer will be glad to suggest those best suited to your needs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

TUNE IN . . . METROPOLITAN OPERA RADIO BROADCASTS EVERY SATURDAY AFTERNOON

Metalworking Outlook

Strike Idleness Low in '57

Strike idleness promises to be lower in '57 than in any of the last 15 years. Only 825,000 man-days were lost in February, compared with 550,000 in January. If that two-month rate continues, only 8,250,000 man-days will go astray. In other good years, such as 1954 and 1951, at least 22 million man-days were lost. Work stoppages will become more numerous as 1957 wears on, but odds are good that less than 20 million man-days will go down the drain.

The Cost of Absenteeism

Prolonged illness and absence from the job costs employees in private industry 13 per cent of their annual income—a total of $800 million in lost wages, plus personal medical expenses. Almost $2 billion in production time is lost annually from this cause, says Research Council for Economic Security, Chicago. Prolonged illness strikes employees at the rate of 39 per 1000 on the payroll. Of employees studied, 6201 had prolonged illnesses, defined as lasting more than four weeks. Average duration of those illnesses was 10.9 weeks.

House Eliminates BDSA Funds

Congress' budget cutting mood hit hard at metalworking last week. The House cut $218 million out of the Commerce department's appropriations bill, deleted $3.6 million for Business & Defense Services Administration. Some 352 employees would be fired in the industry's divisions, virtually eliminating the BDSA as an agency. Secretary of Commerce Sinclair Weeks appealed to the Senate Appropriations Committee to restore $3.3 million to BDSA. An Office of Defense Mobilization spokesman flatly states, "It would be almost impossible for ODM to make further progress in the trigger and elephant tool program without BDSA."

Estimates Up for Power Needs

American industries will require 450 billion kw-hr of electrical power in 1963—much more than had been previously calculated. So predicts A. C. Monteith, Westinghouse Electric Corp. vice president for apparatus products. The new figure is 12.5 per cent over the prediction for 1963 made three years ago. The electrical industry used to figure on power use doubling every ten years. Now it's doubling every seven. A General Electric Co. vice president, Glenn B. Warren, predicts that installed capability and peak loads met will be some 625 million kw by 1977.

The Heat Pump Begins To Click

Look for 1957 to mark the beginning of volume sales for heat pumps. The device provides year-round heating and cooling, extracting heat from the

outside air in the winter and reversing the process in the summer. The number of heat pump installations in residential and commercial buildings should reach 24,000 by year end, double the number at the end of 1956. Most of the units are in the South, Southwest and West.

Columbia-Geneva Hunts for Ore

U.S. Steel Corp.'s Columbia-Geneva Steel Division is pushing its search for iron ore in Wyoming. A test tunnel has been driven 200 feet into a deposit in Fremont county. The tunnel will be extended another 500 ft. After the tests, a decision will be made about the scope of facilities needed for mining operations, crushing and beneficiation.

No Shortage of Engineers?

"We are not really short of trained engineers," says George E. Kopetz, production vice president for Blaw-Knox Co. He estimates that "some 30 per cent of our graduate engineers . . . are walking the skid row of professional neglect." He attributes that to pigeonholing of engineers in routine assignments, diversion to "administrative" work that is really glamorized clerking, lack of management training and inconsistent salary administration. He chides engineers, too, for lack of professional spirit, pride, profit-mindedness, and aggressiveness.

Harvester Tries Sales Pitch

International Harvester Co., Chicago, is making part-time salesmen out of all its employees. Harvester people get small cards that they are asked to mail to their grocers, cleaners, dairies, utilities or anyone else when they are paying monthly bills. The card carries a message expressing appreciation of the business establishment's service. It notes the products Harvester makes and suggests that those products be considered when the firm makes future purchases. The employee response was overwhelming. Requests quickly exhausted the original printing of 500,000 cards. A supplemental order doubling that number was rushed through.

Straws in the Wind

U.S. Steel Foundation Inc. will grant nearly $1.8 million this year to more than 600 private schools and colleges . . . Pension fund assets now exceed $14.2 billion . . . Indications are that the slump in private heavy construction contracts will end fairly soon . . . A suit that claims $20 million in profits vanished in the accounting procedures of Reserve Mining Co. has been filed by stockholders of Mesabi Iron Co. which leases 10,000 acres of the Mesabi range to Reserve; both Mesabi and Reserve are named as defendants.

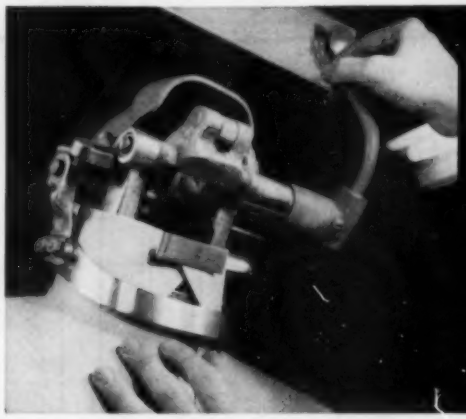
LOOK, THERE'S OLD PLUTO POURIN' ANOTHER TEST!
IF HE DON'T KNOW WHERE THAT HEAT STANDS NOW, ANOTHER TEST AIN'T GONNA HELP HIM.
WE OUGHTA TELL THE BOSS HE'S BEEN BLAMIN' THE WRONG GUYS FOR THEM SHORT HEATS.
?
THANKS TO C.R. ABERCROMBIE, ASST. GEN'L FOREMAN, O.H. DEPT., J&L STEEL CORP., PITTSBURGH, PA.
KUEKES

The Worrier

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

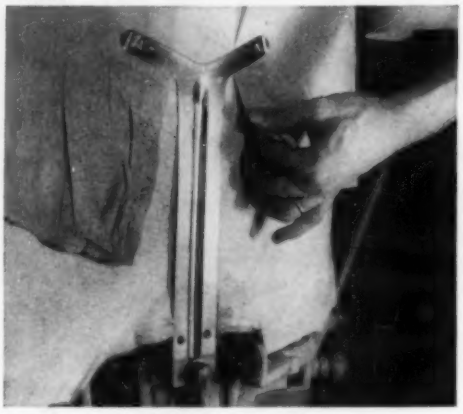
The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

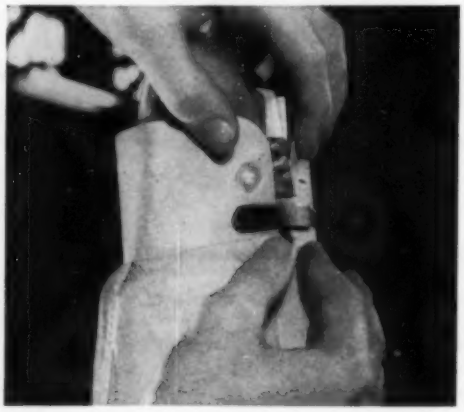


Special
ARMCO STAINLESS STEEL
Helps Presses Keep Their Shirts On

CLAMPS COLLAR—Despite repeated flexing action, this curved collar clamp must not take a permanent set. The excellent spring properties offered by Armco 17-7 PH are essential.



TETHERS TAIL—This Y-shaped shirt-tail clamp of Armco 17-7 PH Stainless replaced a more costly, two-piece plated clamp. Strength and springiness help it do its job. Workability, ease of heat treatment, and the simple design possible with Armco 17-7 PH, make it economical.



GRIPS CUFF—Firm grip is required of this cuff clamp. It must not mark cuffs, yet must hold steady. Made from Armco 17-7 PH Stainless, it is tough—won't break even after long service.

"They don't lose their grip"

That's what designers at The American Laundry Machinery Company, Cincinnati, Ohio, say about three husky clamps made of Armco 17-7 PH Stainless Steel on their "Formatic" shirt presses.

Despite repeated bending action, the clamps don't take a permanent set. They maintain their "spring" because of the exceptionally high strength and elastic properties of this special Armco Stainless Steel. They resist corrosion, too . . . help keep shirts spotless.

Moreover, this special stainless steel holds down production costs as well as it holds down shirts. It is easily fabricated in the annealed condition; then, "spring temper" is readily achieved by heat treatment with a minimum of distortion.

Freedom from rust, easy cleaning, and durability are indispensable in laundry machines. For these reasons, The American Laundry Machinery Company also uses other stainless steel types wherever possible throughout a complete line of commercial laundry equipment.

Need Corrosion-Resisting Springs?

Investigate Armco 17-7 PH. It is produced in sheet, strip, plate, billets, bar, and wire. A companion grade, Armco 17-4 PH, is supplied in billets, bar, and wire. For more information about these Armco Precipitation-Hardening Stainless Steels, call your nearest Armco Sales Office or write to the address below.

ARMCO
Steel Corporation

1247 CURTIS STREET, MIDDLETOWN, OHIO
SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Modernize Your Marketing

Ask any management man what is his No. 1 problem today and you most often will find this answer: "How to get more business."

The problem of getting more business often is cited by managers who have expanded and modernized their plants with the latest production equipment but who have not brought their marketing methods up to date.

That marketing inertia can be attributed largely to the sellers' market in which most companies have been reveling for more than a decade. It was easy to get by with antiquated or noncompetitive selling. Consumers were obliged to take what was available. Service often was nonexistent.

Much of this easy-selling concept carried over into the present buyers' market. But it results in little business from the consumer who knows he again can assert his right to freely choose what he wants to buy.

More often than not, he is turning to the companies that have modernized and streamlined their marketing methods along with their production facilities.

Those companies are finding out what the customer wants and the prices he is willing to pay.

They are using market research to determine market location, size and composition and potentials. Consumer attitude studies provide information about what the customer is thinking when he accepts or rejects a product.

They are helping salesmen do a more efficient job through training and sales clinics. Salesmen are learning that it is easier to capture the imagination of a customer and help him with his problems than to pressure him.

They are finding that mass selling must be co-ordinated with personal selling. Advertising and promotion get at the hidden influences affecting sales, create acceptance for the product.

They are speeding distribution. Paper work handling that takes as much as two weeks can be reduced by mechanization to as little as two days. Improved packaging and handling methods shorten delivery time.

They are providing adequate, courteous service after the sale is made. Modern marketing is doing a better job for the customer.

The seller who is to get his rightful share of the available business (or maybe a little more) must not only bring his methods up to date; he must ever be alert to ways to improve on the best known practices of today.

Irwin H. Such
EDITOR-IN-CHIEF

"Here's a hot one for the slitters

60,000 lbs. of slit coils . . . delivered early tomorrow!"

A TRUE STORY *of Ryerson service—the kind that makes Ryerson your best source for every steel requirement.*

It was ten after five. The phone rang and a steel buyer 80 miles away said: "I've simply got to have 60,000 lbs. of slit coils first thing in the morning."

Impossible?

Not at Ryerson. This kind of service is what Ryerson customers have learned to count on when emergencies arise.

The needed steel was on hand in Ryerson stocks. Unequalled slitting equipment was put to work. And during the night two different gauges of steel coils were slit to meet two size requirements. Early next morning the steel was delivered *as promised* . . . 80 miles away.

You don't have to wait for an emergency to appreciate Ryerson service. Our stocks and processing facilities enable us to meet practically every demand for steel—no matter what the shape, size, quantity or time requirement.

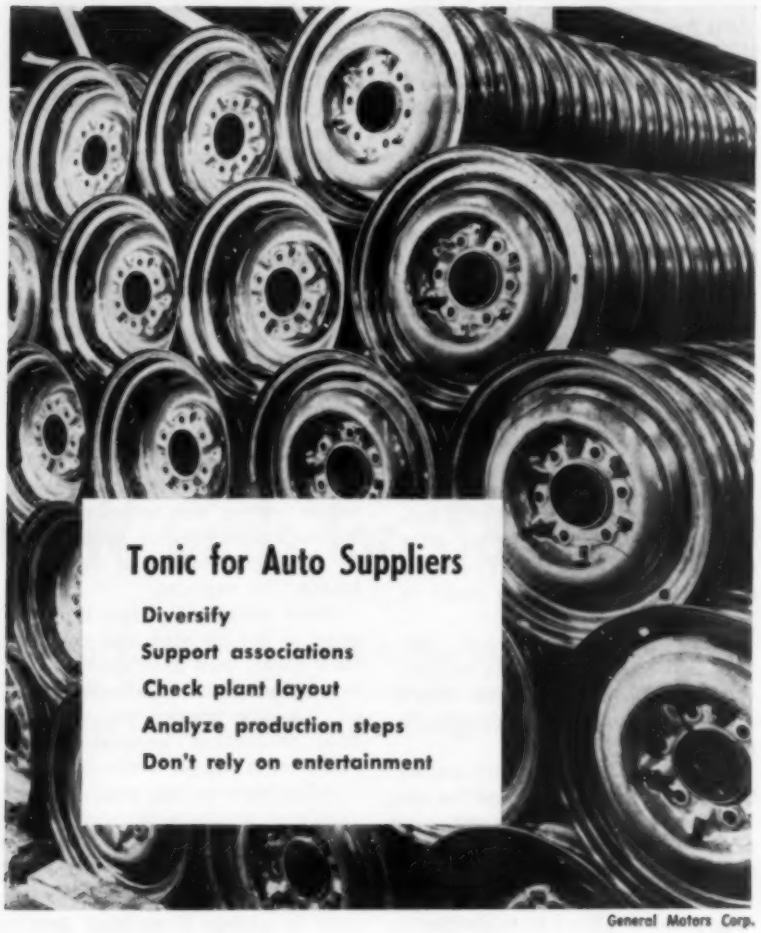
In addition, you can always depend on Ryerson for steel of high uniform quality.

So call your nearby Ryerson plant for steel or help on steel problems with the assurance of close personal attention by specialists who make your problems their own.

In stock: Carbon, alloy and stainless steel—bars, structural, plates, sheet and strip, tubing, re-bars—industrial plastics, machinery & tools, etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



General Motors Corp.

Auto Suppliers Face Crisis

Larger firms diversify as car builders swing toward greater integration. Others are taking a close look at production methods in effort to reduce their costs

SUPPLIERS to the auto industry are finding 1957 a year of mixed blessings. Some say business is good; others are losing their shirts.

Many companies, large and small, report 1957 looks as good or better than 1956.

Prosperity—McCord Corp., Detroit radiator company, adds that its second fiscal quarter (ended in February) was substantially better than its first.

A small fastener maker indicates sales are at least 10 per cent ahead of 1956's, and a stamping plant reports 1957 will at least equal 1956.

Harry D. Hirsch, president, C. M. Hall Lamp Co., Elwood, Ind., expects a volume of $7 million to $8 million this year, compared with $5.7 million last year.

Blues—In contrast, Pressed Metals of America Corp., Port Huron, Mich., closed its doors last month because it couldn't get business. Four small fabricating shops in a 2-mile area in Detroit have gone bankrupt within the last three months.

Orrin B. Werntz, executive vice president, National Screw Machine Products Association, Cleveland, says: "NSMPA members in the Michigan area have the poorest profit picture in the industry and have shown the poorest gains."

Causes — Two factors seem to be responsible for the auto supplier's dilemma: 1. Fierce competition. 2. More captive shop production.

The Automotive Parts Manufacturers Association figures that about 400 companies supply almost 80 per cent of the parts that aren't made in captive shops.

This leaves 20 per cent to be divvied up among an estimated 30,000 smaller outfits.

Nobody's quite sure, but the number of suppliers probably hasn't changed much for five or six years, although turnover may be as high as 10 per cent.

Integration — While competition remains at high levels, auto makers are further complicating the picture by moving more work into their own shops.

Ford Motor Co. is making most of its own steering gear assemblies. It recently installed a $240,000 stamping press at its Monroe, Mich., parts plant which will turn out 1600 hubcaps a day.

Mourns a supplier who suddenly found himself on the outside: "Where would I get $240,000 for a press like that?"

Chrysler Corp.'s Twinsburg, O., stamping plant will start making 1958 hoods, decks, doors and quarter panels. Budd Co., Detroit, has been doing the work, but this operation could put it completely out of the auto stamping business.

Target — Tooling seems to be next on the agenda. Rumor has it that Chevrolet's Fisher Body Di-

vision is doing 75 per cent of its own '58 tooling. Ford also is reported to be bringing in more of its own tool and die work.

Besides cutting into potential sales, integration puts the auto companies into competition with job shops for skilled labor, suppliers complain.

One tool and die shop owner puts it this way: "We have to meet the same wage rates, but we can't possibly meet the fringe benefits the Big Three offer our men. If they want 'em, they'll get 'em!"

Other Side—Ford, Chrysler and GM have built a tremendous battery of plants to meet the 8 million and 9 million car years predicted for the 1960s. They can't let these facilities stand idle.

Nor can they afford to buy a part when they believe they can make it cheaper. As one GM purchasing agent puts it: "We aren't running a charity. Just ask our stockholders."

So the squeeze continues. Purchasing agents point to a figure and say: "That's what we can make it for. You'd better be able to meet that price if you want our business."

Scrap — Suppliers fight among themselves, often lose money on contracts and sometimes resort to entertainment to land accounts. Take the case of a builder of heavy machinery: It tried to butter up purchasing agents with a week-end flying trip, then discovered that competition already had the order.

Suppliers have started to admit they may be partly to blame for sagging sales. When auto makers put on the squeeze, the firms that folded first often found the reasons in company history.

William M. Hoad, professor at the University of Michigan's School of Business Administration, flatly states that mismanagement is the big cause of small business failures.

One medium-sized maker of auto parts in Detroit is a case in point. It had absentee management—mostly a family affair. In lush years, the owner milked off profits.

Nobody bothered to renovate old facilities or develop new products. Now the firm is teetering. Best guess is it will be out of the auto business within two years.

Solution — "These are the facts . . . but what's the solution?" ask suppliers.

One thing is sure. Help has to come mostly from within. The government just turned down a proposal for small business tax relief. Most companies shy away from Small Business Administration loans because of the red tape involved.

Associations can be helpful (see STEEL, Mar. 25, p. 61), but members must give them active support before they can get real returns.

Spread Out—Companies that can pick up the tab are merging to diversify their product lines. Most of their new products are out of the automotive field. They don't fall in any one area, although electronics seems to be most popular at the moment.

Kelsey-Hayes Co., Detroit, is a good example. It used to be Kelsey-Hayes Wheel Co., but after buying into the aircraft component field, it changed its name in 1956.

Perry Williams, president, figures that aircraft products will account for 50 per cent of the firm's sales this year, compared with 20 per cent last year.

Another Way — Smaller outfits that don't have the money for diversification face a different picture. They have these choices:

1. Concentrate on a product auto makers can't do without but probably couldn't afford to make themselves. Examples: Fasteners, small forgings, special trim and ornamentation. At least one successful supplier dissuaded an auto company from making the part itself. It made a cost study which proved to the big firm that it wouldn't be making the components as cheaply as it had figured.

2. Recognize that not much can be done about labor or material costs and concentrate on production areas in which pennies can be pinched to meet target prices.

Here are two case histories that suggest courses to take:

Shrinks — Claude F. Brogden, president, Master Spline Tool & Gage Co., Detroit, was losing money on automotive tooling contracts. His 23,000 sq-ft plant had a tool crib at one end.

"I only had about 55 men. Every time one of them needed a tool, he had to walk to one end of the shop to get it. By the time he'd chatted with all his buddies en route, we were out valuable time."

So Mr. Brogden moved all his machines into a shop with only 7500 sq ft. The tool crib was scrapped, and tools were racked near machines. Only a few men were dropped.

Result: Master Spline shifted from red to black ink, showing 5 per cent profit. The men liked being trusted with tools and production increased.

Analyze—Kean Mfg. Co., Dearborn, Mich., makes pierced clinch nuts for the automotive trade. Faced with a similar situation, Bill Strain, co-owner and sales manager, talked with each machine operator and analyzed every production step.

"We soon found the way to increase output was to step up our tapping rate without losing quality. Hoppers and taps had to be better," he explains.

Kean contacted every tap supplier in the country and collected their ideas, then developed its own tap and a special sharpening method. A new hopper was designed and production boomed. Kean looks for a 10 per cent—or better—sales increase this year.

Pontiac Refurbishes Foundry

Pontiac Division of General Motors is adding a molding line to its gray iron foundry. The line will be in operation this fall, reports T. R. Schroeder, foundry superintendent.

This addition follows installation of two 30-ton electric furnaces which were started up last October.

An improved air conditioning system is being built into the foundry. Roll type doors in the addition can be adjusted to catch prevailing winds and channel them through the plant.

As part of the original conversion, Pontiac has switched its eight cupolas (including the two new ones) to the front slag type, with water gland cooling to reduce heat.

Mr. Schroeder asserts the revamping will result in improved working conditions, more positive metal control and over-all cost reduction.

What UAW Wants in 1958

1. *Shorter work week.*
2. *Higher take-home pay.*
3. *Improved SUB, pensions, insurance.*
4. *Shorter contract period.*
5. *Worker protection in plant relocation.*
6. *Separate skilled work contracts.*

UAW Girds for '58 Battle

Demands to include more pay, shorter work week, expansion of fringe benefits. Reuther calls for special January convention to kick off 1958 contract negotiations

IT was muscle-flexing time for the United Auto Workers in Atlantic City, N. J., last week. They built the framework for the new bargaining demands that'll appear at contract time next year.

As expected, the demands are big (as the accompanying list shows). Equally important to metalworking are some of the constitutional amendments and recommendations which on the surface carry no dollar signs but promise to bring bargaining headaches.

More Pay, Less Work—At the top of the demand list are more pay and a shorter work week. Significantly, President Walter Reuther is emphatic: "The two are definitely related. It's unrealistic to talk about a shorter work week with the same take-home pay.

Wait and See — Certainly the union's serious about the short work week, but whether it will strike for it is only speculation. The loud shouts are for public consumption. Mr. Reuther admits the specific direction of the short work week is still undecided, though worker sentiment favors a four day week as opposed to a shorter work day.

In addition to substantial pay boosts, the union will be seeking an expansion of fringe benefits:

Extension of the Supplementary Unemployment Benefits coverage to 52 weeks from the present 26; protection against short work weeks; increased weekly benefits; liberalization of eligibility provisions (aimed particularly at providing workers full benefits from the SUB fund in states which do not permit integration of SUB and unemployment compensation.

Want More—The Big Three auto companies paid out $4.3 million in benefits between June, 1956, and February, 1957, the UAW chief pointed out. "We'll demonstrate conclusively that the financing mechanism will support greater benefits," he related.

Better pensions and hospital-medical care also will be sought.

Aim—Mr. Reuther declined to estimate a probable package cost. But he was quick to point out "it'll be the largest package we've ever demanded. It will reflect the increased productivity and there's no doubt in my mind that we'll move ahead of any other industry."

Of major importance to management is an executive board recommendation for worker protection against plant relocation and shift in work. Provisions are:

1. When plants are relocated, workers will have the right to transfer to the new location with full seniority rights, pension, vacation, insurance and SUB credits.
2. If the worker exercises his right to transfer, cost of relocating will be paid by the company.
3. When a plant is moved from one location to another, the union will retain rights as the bargaining unit. Contract standards in effect at the former location shall apply in the new plant.
4. Workers not exercising the right to transfer will receive compensating severance pay.
5. In multiple plant corporations, area-wide seniority agreements will be established to facilitate transfer of workers from one plant to another. This would permit workers to exercise seniority rights in other plants when they are laid off in their own.

New Strengths—Effects of skilled labor's newly won bargaining strengths will be felt in future negotiations. They have the right to vote separately on their wage negotiations, plus the right to strike independently.

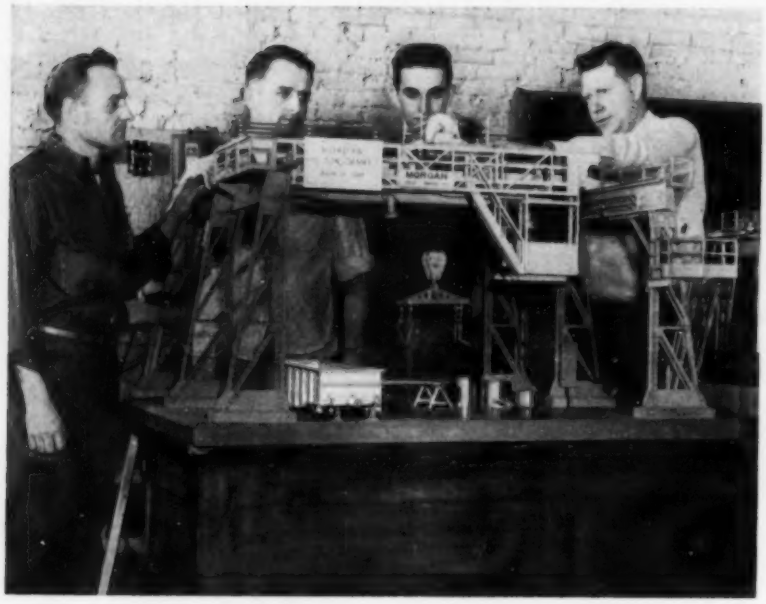
One of the major developments of the convention was the establishment of a special convention for next January. This will be the pep rally in preparation for 1958's contract negotiations.

On the Docket—Two major items on the docket for this convention:

1. Spell out the specific demands.
2. Set up an emergency strike aid program to "insure the economic resources to effectively present our bargaining demands."

New Tack—Another noteworthy move in UAW strategy for the 1958 bargaining sessions is the shift to payment of strike benefits based on the "rights to" rather than "need for" benefits.

Look for the union to refuse another three-year contract. From now on, two years will be maximum.



John Leutschaft (right), apprentice supervisor, explains . . .

Morgan Has Skills Aplenty

MORGAN Engineering Co., Alliance, O., has all the skilled workers it needs.

The company is in this enviable position because its apprentice training program is flexible enough to be revised as needs change. (It recently added four new classifications and increased the ratio of apprentices to journeymen to take care of increased future needs.)

Insurance — "Our apprentice training program," says President William H. Morgan, "insures top quality men." He speaks with a great deal of authority. The company has been educating its own apprentices for 68 years.

The sprawling manufacturer of all types of heavy duty electric cranes and related steel producing items maintains a separate department for apprentice training.

Pay-Off—Today, 104 journeymen machinists are employed in the plant—64 came up through the apprentice school. Of 45 journeymen draftsmen, 13 came from the apprentice school. Fifteen other graduates who became journeymen draftsmen have been advanced to higher engineering jobs.

Four of the 16 journeymen electricians now employed graduated from the apprentice school, and three other graduates are holding higher jobs in the department. Of the ten machine shop foremen, seven came from the apprentice school.

Expansion—"We have been so pleased with results that the company decided to add four more groups to the program," says John Leutschaft, apprentice supervisor. They are: 1. Floor erector. 2. Electrical draftsman. 3. Millwright. 4. Tool draftsman.

"As the need for other jobs arises, they will be added," continues Mr. Leutschaft. Morgan currently has 69 apprentices in training. Thirty-four are studying to be machinists.

Cost—It takes four years and an estimated $5000 to $6000 to train an apprentice. Of course, the figure is difficult to arrive at since aptitudes vary among individuals. "Some of these boys produce as much or more than a journeyman long before they complete the course," says Mr. Leutschaft, who is a journeyman machinist and a graduate of the apprentice school.

Morgan started apprentice training in 1890 because it had difficulty obtaining competent replacements. For many years the plan consisted of hiring a young lad to hang around the machine shop and do odd jobs under the direction of journeymen.

Reorganized—In 1947, a related training program was instituted in which apprentices received classroom instruction in addition to training on the job. Classes were held on company time but difficulties arose because of the variety of trades and because apprentices were entering training at different times.

During this period (1945), Morgan's apprentice training program was approved by the Bureau of Apprenticeship, Department of Labor, and registered with the Ohio State Apprenticeship Council.

Modernized—In 1953, the Training Department was made a separate unit of the company under a training co-ordinator who reports to the director of industrial relations. Result: A new program.

Each apprentice now spends 8400 hours in training. This includes time in the shop and related training in the classroom. Courses based on shop operations were selected from a correspondence school. They are flexible.

Initiative—The progress of each apprentice depends on his own initiative. He may take all the courses offered if he can master them.

At the completion of his training, each apprentice is given a certificate and $100 toward the cost of his tools.

Waiting List—A candidate must be between 16 (legal working age in Ohio) and 25 and meet other requirements. Applications far outnumber openings. Many are on file two or three years before the applicant can get in.

Table models of Morgan's various products are set up in a classroom as another training feature. In this way, the apprentice who works on a giant steel girder for a 500-ton ladle crane (STEEL, Feb. 25, p. 106) can get the big picture.

Executive Vice President Eppert tells how . . .

Burroughs Reorganizes

BURROUGHS CORP., Detroit, is reorganizing into a line and staff operation.

Three divisions have been formed since last June. Four more groups will be given formal divisional status in the near future.

The move has been in the works for almost five years. As Ray R. Eppert, executive vice president, puts it: "You just don't decide to go to divisional operations on a Monday morning."

A peek into the corporation's history shows how the switchover came about.

Rear View—Burroughs was organized in 1886 as the American Arithmometer Co., St. Louis. In 1904, it moved to Detroit and the following year changed its name to Burroughs Adding Machine Co. Corporate status came in 1953.

The company did a profitable business in adding and accounting machines and cash registers, gradually getting farther into office supplies and simple computers.

World War II war contracts gave it an inside track on future defense products.

Electronics developments seemed a natural move. Overseas marketing was expanded.

Deep Breath — This pattern of growth continued until about 1952 when the company took a good look at what had been happening.

It was making general business machines and office supplies, check and payroll systems and defense products. It was about to move into the electronics field in a big way. In fact, the firm was making everything from carbon paper to nuclear reactor controls.

Total income had climbed from $40 million in 1946 to $149.5 million in 1952. The company had almost 20 plants and over 18,000 employees scattered around the world.

Same Old Boss — The management structure had changed little from early company days. It was a straight line outfit. Top executives handled routine operations and tried to set policy.

Instead of divisional managers, it had activity chiefs. Finance, for example, was headed up as an activity, but the financial problems of making typewriter stands are much different from those involved in producing giant electronic brains.

Activities heads often lacked authority to make major decisions for the handful of loosely knit operations.

Shakedown — According to Mr. Eppert, Burroughs decided it had to do three things:

- Free top executives so they could plan for growth.
- Set up a better method of developing badly needed executive personnel.
- Tie engineering, production and marketing together for each product or product group.

As Burroughs picked up new companies or added product lines, it shifted them into groups which formed the nucleus of divisions.

Manufacturing, engineering and marketing facilities were set up for each group or operation.

Job responsibilities were outlined on a divisional basis to give line men responsibility and authority.

Employees were kept informed of mergers and plans through company publications. Relatively few jobs were affected by the shifts.

The stage was set for the next move.

Curtain Call—In June, 1956, Bur-

roughs bought ElectroData Corp., Pasadena, Calif. Since the electronics computer firm already was well organized, it became the ElectroData Division.

February, 1957 — The company combined its commercial business machine facilities into the Burroughs Division. Most of these plants are in the Detroit area.

March, 1957—The International group was given divisional status. It includes engineering and manufacturing as well as marketing.

Next Step—Research and development have been operated as a separate entity since 1954. The unit soon will get a division name, but will be under a general manager instead of an operations vice president like other divisions. Mr. Eppert explains that research will work for the executive staff as well as for individual divisions.

The fate of four subsidiaries still isn't settled. Mittag & Volger Inc., Park Ridge, N.J., and Acme Carbon & Ribbon Co., Toronto, Ont., make business supplies. Eventually, they may be linked to the Todd-Hadley products group (business machines) to form a Graphic Systems Division.

Control Instruments Co. and Electronic Tube Division probably will provide the nucleus of an instrument division.

Expanding—Burroughs is completing six new plants with 748,000 sq ft of space. More construction is on the way, including an executive staff office building in northwest Detroit.

The company has 29 plants and 33,000 employees. Revenue in 1956 was $273 million, $53 million more than in 1955.

Results — Line divisions have management teams which work together. They have the responsibility and authority to help them develop as potential top executives.

Top management now operates as a functional staff with time to plan for growth. It's tied to the divisions through division general managers (vice presidents).

Future — The biggest problem top management faces is keeping its hands off divisional operations.

Burroughs believes its new line and staff setup will tie top management and line supervisors more closely together; give each group a chance to develop its own goals.

Republic Grows

Big boosts in ingot capacity and finishing facilities will be completed by year's end

THE $200-MILLION expansion program of Republic Steel Corp., Cleveland, is nearing completion, says Ernest R. Johnson, vice president in charge of operations.

About $166 million is being invested to increase annual ingot capacity 1,980,000 tons. The remainder of the expansion involves finishing facilities.

Finish Date—The entire program (it was started in September, 1955) is expected to be completed this year.

Some facilities already are in operation, and most of the others will be ready this summer.

At Cleveland—Two large open-hearth furnaces under construction will boost the capacity of this facility 500,000 ingot tons a year. One furnace is scheduled to be put in operation about Aug. 1, the other about Oct. 1.

A mill to roll slabs up to 75 in. wide, an 80-in. cold temper mill and additions to the hot strip mill are expected to be ready this fall.

At Warren, O.—Two electric furnaces are being added here. The first furnace is scheduled for operation in late June, the second will start up about a month later. They will add 408,000 ingot tons to the plant's present annual capacity.

By June, a 42-in., 3-stand tandem cold reducing mill is expected to be in production at this plant. Also nearing completion are a continuous pickling line and six new continuous annealing lines for producing silicon steel.

At Chicago—This plant is adding 372,000 tons to its ingot capacity, boosting its rolling facilities and increasing its wire capacity about 50 per cent.

An electric furnace was enlarged and converted to top charging in February. Another will be changed over this month, and one more is to be ready in July.

Nearly all the wire mill expansion will be completed this summer. During the fourth quarter, a 32-in. rolling mill and an 11-in. bar mill are expected to be finished.

Kaiser Ups Plans

$81 million added to its current $113-million program will boost capacity to 3 million tons

THE WEST will have increased supplies of plates, sheets, tin plate and pipe when Kaiser Steel Corp., Oakland, Calif., completes its expansion in mid-1958.

The entire program (it now totals $194 million) will raise Kaiser's annual ingot capacity from 1,536,000 tons to about 3 million tons. Employment will be increased by 2700.

What's New — The $81 million addition to the expansion includes:

1. A third oxygen steelmaking furnace.
2. A second sinter plant.
3. A new blast furnace, the fourth for the Fontana plant.
4. Conversion of the existing 110-in. plate mill into a 144-in. mill to make wider plates, up output.
5. Two soaking pits.
6. Ninety coke ovens, increasing the number to 315.
7. Improvements at Kaiser's Eagle Mountain, Calif., iron ore mine and at its Sunnyside, Utah, and Raton, N. Mex., coal mines.

The new blast furnace to be built at Fontana will increase pig iron production 630,000 tons annually.

Under Way—Facilities included under the original $113-million expansion and now under construction at Fontana are:

1. Two oxygen steelmaking furnaces.
2. Eight soaking pits.
3. A universal slabbing mill for the initial rolling of steel ingots.
4. An independent hot strip mill.
5. An electrolytic tin plate line.

Construction of projects in the original program started in June, 1956, and the program is more than one-third completed. Some of the units will be placed in operation late this year.

Where Systems Engineering Fits In

1. Looks ahead, anticipates future needs.
2. Keeps abreast of new ideas, principles, technology, methods, devices.
3. Develops long range plans and objectives as a framework for tying together individual projects.
4. States objectives quantitatively as well as qualitatively.
5. Co-ordinates individual projects with these long range goals.
6. Forecasts performance, costs and possible areas of use.
7. Examines resources needed to carry development to completion. Analyzes risks involved.
8. Avoids being too conservative. By taking big steps forward, the newly developed system should not become obsolete quickly.
9. Avoids false starts. Makes certain needed technical material is prepared before assigning manpower for final job execution.
10. Communicates with management. Provides enough data to help management guide and control the over-all program.

Source: M. L. Almquist, systems engineering director, Bell Telephone Laboratories Inc.

AMA panel explores how to get the most from . . .

Your Engineering Program

A STRONGLY staffed engineering department just doesn't happen. It is built through management's ability to understand and communicate with the various levels of its engineering organization. One modern method: A systems engineering setup like the one outlined above.

At an engineering management forum, sponsored by the American Management Association (New York, Apr. 4-5), metalworking executives discussed ways to strengthen technical departments and co-ordinate them with management.

Importance—R. C. Sebold, vice president-engineering, Convair, Division of General Dynamics Corp., San Diego, Calif., reported: "Of some 70,000 persons in our organization, more than 20 per cent are directly involved with product engineering." He recommends:

1. Keep the engineering organization technically flexible. The department must be able to act quickly on new technical data being generated.
2. Communicate with decision makers constantly so that changes can be incorporated quickly.
3. Investigate use of development groups rather than separate development and production engineering departments.

Human Equation—"Part of the problem of proper staffing stems from the fact that we are willing to spend time and money to attract personnel, but tend to neglect the engineer when he goes on the job," challenged John H. Flynn, student personal services director, Boston University. Possible solution: Establish a system for counseling, promotion and pay adjustments for both new and old employees.

Another Problem—Clarance H. Linder, vice president-engineering, General Electric Co., New York, explained: "Our engineering departments have to run fast technologically just to keep pace with competition. We must continually try to build an optimum coupling between workers, skills and the needs and wants of our customers." One approach: Keep manufacturing, engineering and research (and/or product engineering) closely integrated.

During question and answer periods, engineers voiced strong approval of the team concept for engineering departments. Said one: "Job titles should be only an organization tool for administrative purposes. From then on, manufacturing engineers should be constantly passing along new techniques to product engineering. Product and research engineering groups should ask for manufacturing advice."

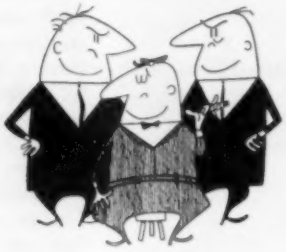
Alternate Approach — Reported an engineering executive: "We have our top supervisors bird dogging several projects. This gives them an opportunity to see solutions to several problems at one time—allows them to pass along lessons learned from group to group." Another advantage: It keeps supervisors from becoming too vertical, helps them keep overall company objectives firmly in mind."

More Tubing by Columbia

Columbia Steel & Shafting Co., Pittsburgh, bought a plant at Scottdale, Pa., where its Summerill Tubing Division will make cold drawn stainless steel tubing.

Thomas L. Parker, vice president, will be in charge of the new plant. Operations are expected to start late this summer or early in the fall.

Senate Stews Over Labor Probe



THE SENATE is juggling the results of the labor-management rackets investigation as if it were hot cobalt.

A member of the Labor & Public Welfare Committee believes chances of revising the Taft-Hartley act this session are now nil. He reasons: If some brash senator dropped a modest revising bill into the hopper, the way would be open for labor's opponents to tack on an amendment for a national right-to-work law (18 states now have one under section 14B of the Taft-Hartley). "To try to revise the law would be to extend an invitation for all sorts of antilabor legislation," he concludes.

New legislation, confined to public disclosure of welfare and pension plans, does seem to stand a chance of passage this year. Two Democrats have placed such a bill before the Senate. They are: Paul Douglas (Ill.) and James E. Murray (Mont.), with the help of Irving M. Ives (Rep., N. Y.). When Sen. John F. Kennedy Jr.'s (Dem., Mass.) Labor subcommittee disposes of minimum wage legislation, it will take up the Douglas-Murray-Ives bill. Pressure will be on the subcommittee to conduct speedy hearings: The bill will probably come out with few changes.

It calls for:

1. Registration of all welfare and pension plans covering 25 or more employees.

2. Filing of annual reports on plans covering 100 or more employees.

3. Regulation by the Securities & Exchange Commission.

4. Disclosure of the annual reports in the SEC Public Documents room. (Also, a summary of the report would be furnished to beneficiaries.)

The last point is the kicker. It's reliably reported only about 200 union members have ever asked the Labor department to see information gathered under special provisions of the Taft-Hartley act (salaries of union officials, for example). How many union members will seek full knowledge of their own welfare and pension funds if they have to come to Washington to get it?

Sen. Gordon Allott (Rep., Colo.) has the answer to that one. Even to post such information on union bulletin boards wouldn't be good enough, he suggests. "That might subject a man to physical pressure, if he were caught looking at it." He advocates complete disclosure of the annual reports by mail to the beneficiary where he can read them in private and form his own conclusions.

Strong opposition will be present in the Senate to any such bill. It won't all come from the Democratic side either. Sen. William F. Knowland (Rep., Calif.) is on record as favoring an approach which would allow the unions the chance to police themselves.

Besides expense account maneuverings, watch for some shocking revelations of collusion between labor and management.

Byrd Hits Fast Tax Write-Offs

Sen. Harry F. Byrd (Dem., Va.), leading exponent of budget cutting in Congress, wants fast tax write-offs stopped, except for research and production facilities for new weapons. No official comment has come from ODM or Defense department but Senator Byrd's ideas are in line with the administration's (STEEL, Apr. 1, p. 54).

Inflation Talk Dies Down

You have to look hard to find much concern over inflation in official Washington these days. Commerce Secretary Sinclair Weeks probably expressed the administration's viewpoint last week: "I don't think you'll see the consumer price index move up much more this year." This unlikely development (only a few months ago the President spoke of inflationary controls) is viewed by most as an attempt to hold down the lid on grass roots discontent.

The index is at record heights, and any further movement upward will continue to gain bold, black headlines. Forecast: Before the year is out, heavy pressure will be put on industry to hold the price line, no matter how hard it hurts. In turn, the administration will talk up corporation tax cuts in '58.

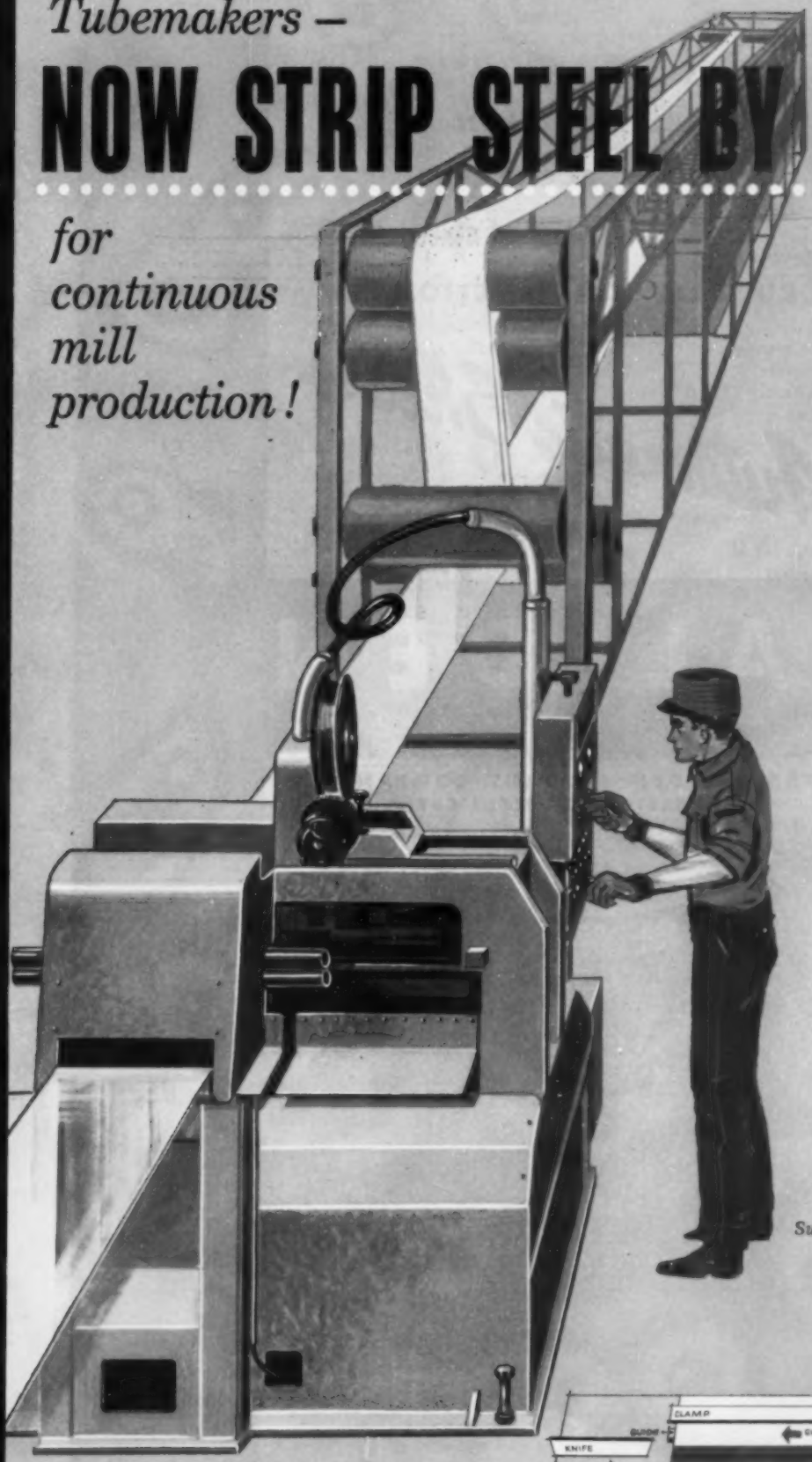
Meet Eubert F. Taggert

For about six months he'll be director of the Electrical Equipment Division of the Business & Defense Services Administration. He's on leave from General Electric Co. where he serves in Cleveland as manager of market planning and development for the company's Apparatus Sales Division.

Tubemakers –

NOW STRIP STEEL BY THE MILE

for continuous mill production!

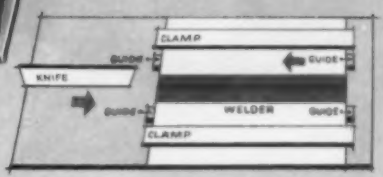


The "MPM SHEAR WELDER" is "a natural" for increasing output and reducing coil end scrap loss.

Perfect welds are a result of positive guiding and clamping, right at the weld area. *(See diagram below.)* Both shearing and welding are done at the same station.

The "MPM" is the fastest, most accurate and compact machine of its kind, that's why tubing manufacturers prefer them over any other type. They are available in a complete range of sizes for any tube mill application. Other types are available for joining strip or sheets of any metal.

Metal Processing Machine Co.
Subsidiary of The McKay Machine Co.
YOUNGSTOWN, OHIO



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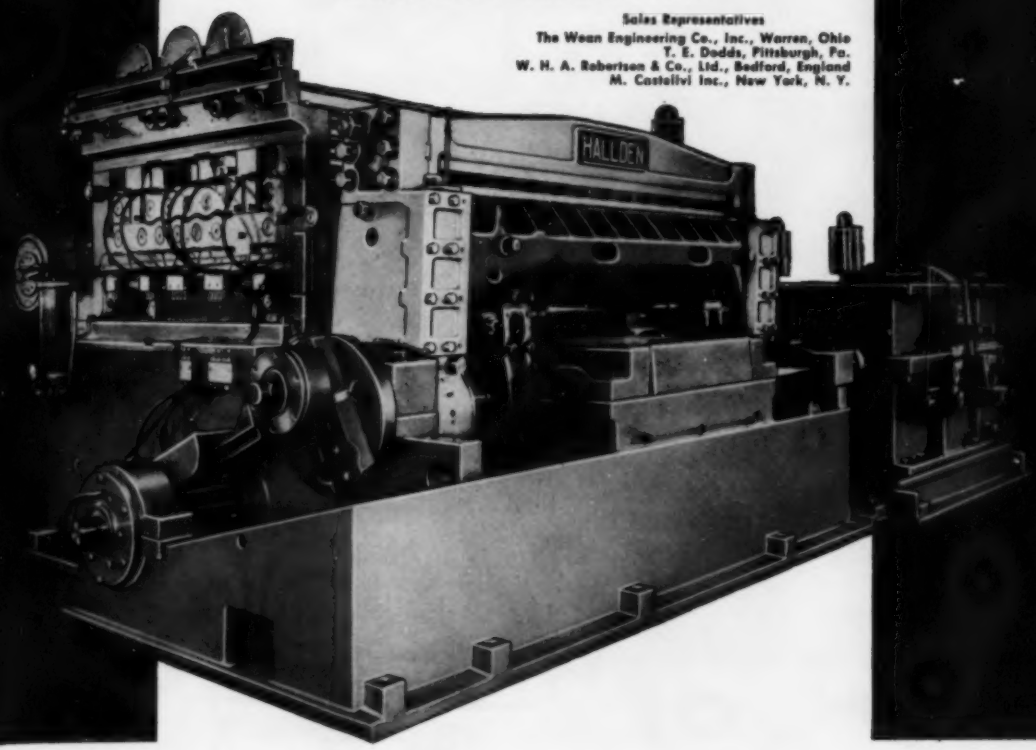


Record Ore Imports

American financed development brings in 34 million tons, mostly from Canada

AMERICAN investments in the development of foreign iron ore deposits are reflected in the record import of 34 million net tons in 1956, says the American Iron & Steel Institute.

The previous record, set in 1955, was 26.3 million net tons. As a mark of expanded ore development since World War II, the institute cites the importation of only 3.1 million net tons of iron ore in 1946.

Steady—Imports have increased every year since the war as U.S. firms have spent more and more in Canada and Latin America to explore and exploit ore deposits. More than 45 per cent of last year's imports came from Canada, and 47 per cent came from seven Latin American countries.

Last year, Canada supplied 15.4 million tons, Venezuela, 10.4 million; Peru, 2 million; and Brazil, Chile, Liberia and Sweden, more than 1 million tons each.

Add $1 Billion to Reserve

Foreign countries gained $1 billion in reserves and private holdings in the U.S. in 1956. They paid $24.5 billion into this country, while U.S. payments abroad totaled $25.5 billion, the Department of Commerce's Office of Business Economics reveals.

Of the U.S. total, private investments in foreign countries reached $2.7 billion, a record, and twice as much as was expended in 1955.

Dow Buys Into Mexican Firm

Dow Chemical Co., Midland, Mich., has bought half interest in Sales y Alcalis S. A., Coatazcoalcos, Mexico. The Mexican firm owns salt mining rights in Vera Cruz where Dow plans to build a plant to produce caustic soda and other alkaline derivatives.

Brazil Improves Railways

Brazil has received a $12.8 million credit from the Export-Import Bank of Washington for the purchase of railway equipment in the U.S. She has already placed an order with General Electric Co., Schenectady, N. Y., for $1.5 million worth of diesel-electric locomotives.

Agreement with German Firm

Electro-Air Cleaner Co., Pittsburgh, has established a licensing agreement with Heinrich Nickel Co., Betzdorf-Sieg, Germany, for the manufacture of its electronic air cleaners in Germany. Heinrich-Nickel, producers of air conditioning plants, will manufacture residential, commercial and industrial models of the electronic air cleaner for sale in Europe, the Near East and Africa.

Tunisia To Receive U. S. Aid

The Kingdom of Tunisia is the newest country to receive economic and technical assistance under the U.S. Mutual Security Program. ICA announced that the U.S. would furnish $5 million in commodities and $500,000 for a technical program, which will be mostly in the fields of industry, education and agriculture. Agricultural and industrial machinery will be among the commodities—to be selected later.

Returns to Germany

Chicago Pneumatic Tool Co. is back in Reich after losing 30-year-old plant during war

CHICAGO Pneumatic Tool Co., Chicago, has bought out the manufacturing rights and good will of Pressluftwerkzeug und Maschinenbau, Geisenheim, Rhein, West Germany.

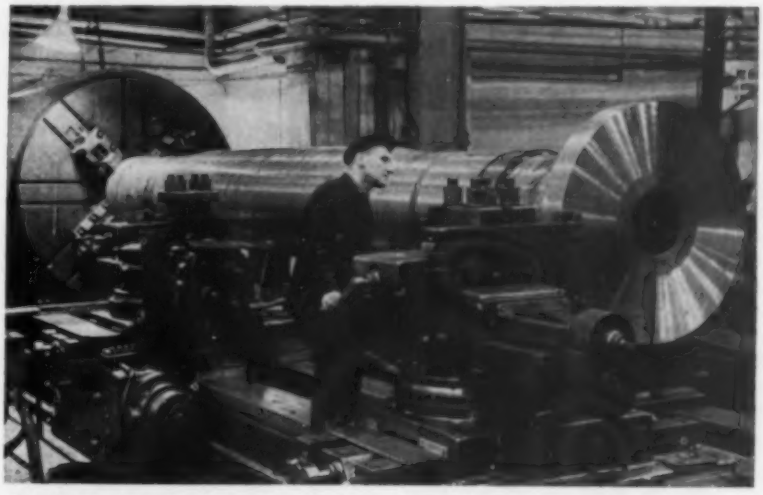
The new firm is named Premag, and will be operated by Consolidated Pneumatic Tool Co., British subsidiary of the Chicago firm. Standardization of design will permit servicing with parts manufactured in the U.S., Britain and Germany.

Return—The Chicago firm owned and operated a plant in what is now East Berlin for 30 years before World War II. It was destroyed during the war.

Chicago Pneumatic now has manufacturing plants and sales departments in Germany, England, Scotland, Australia and Canada.

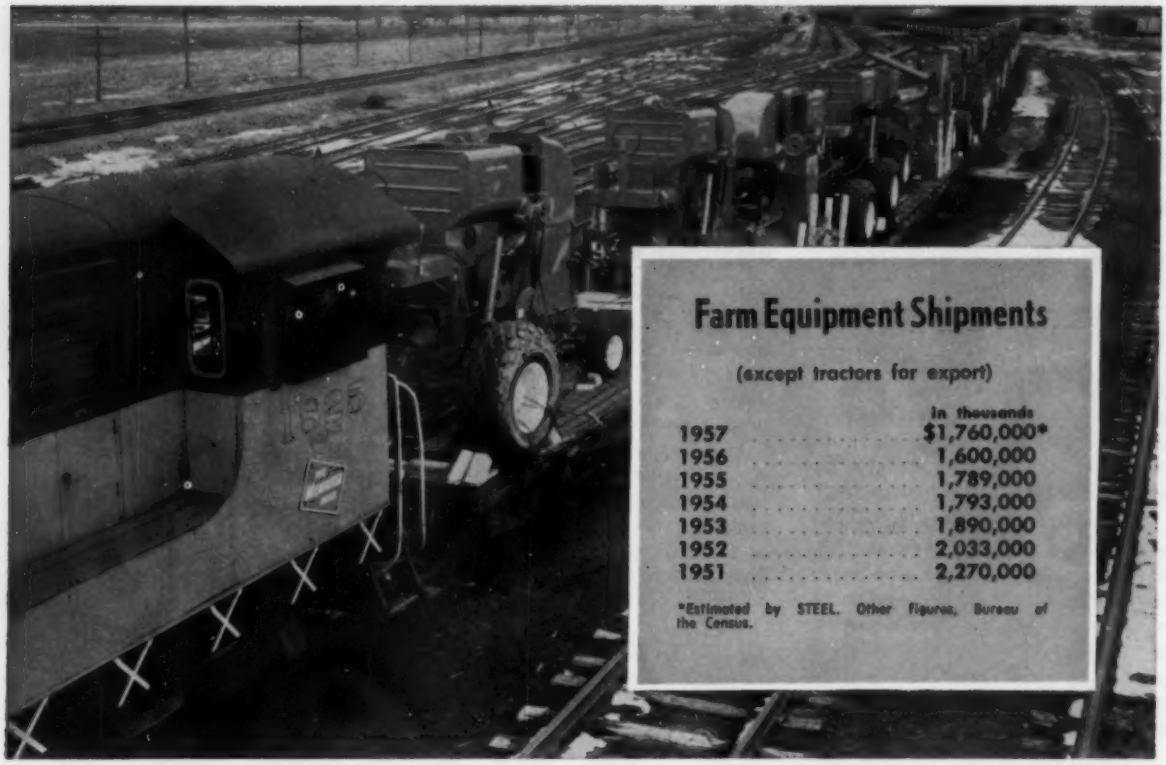
Hedges West German Holdings

Clevite Corp., Cleveland, O., has been given International Co-operation Administration guaranties to protect $250,000 of its investment in West Germany, which is about double that amount.



Soviet's First Atomic Icebreaker Starts on the Line

Manufacture of the powerful electric motor components for the first nuclear powered icebreaker to be produced by the Soviet Union has begun at the Kirov Elktrosila plant in Leningrad



Farm Equipment Shipments

(except tractors for export)

	In thousands
1957	$1,760,000*
1956	1,600,000
1955	1,789,000
1954	1,793,000
1953	1,890,000
1952	2,033,000
1951	2,270,000

*Estimated by STEEL. Other figures, Bureau of the Census.

Deere & Co.

Farm Outlook Brightens

Equipment sales expected to top 1956's even though less acreage is now under cultivation. Manufacturers forecast growing replacement requirements

FARM equipment sales this year may exceed 1956's figure by 10 per cent (see table above).

Despite a slow start, manufacturers estimate that wholesale shipments this year will range from slightly better than last year's to as much as 20 per cent better. At retail levels, sales may be up 15 per cent by year end.

Explanation — Equipment sales fell sharply in 1956. Why the pick-up this year? Four major factors involved in the '56 slump are given by Paul M. Milliken, executive director, National Retail Farm Equipment Association, St. Louis:

1. Great sections of the U.S. were hit by drouth—some for the third and fourth successive year. 2. Farmers suffered from election year jitters—were afraid to plan any long range program. 3. Price resistance caused a drop in sales of new equipment and a corresponding increase in used equipment. 4. Farmers operated for the first time without the artificial stimuli of a farm program based on wartime production goals. The World War II program remained in effect through 1955, and many farmers failed to adjust to more realistic markets in 1956.

Outlook—Those problems are on the way to being solved. The farm picture appears brighter even though acreage under cultivation will be 3.5 per cent less than in 1956 because of the soil bank program.

Reasons: 1. Increased irrigation and conservation are minimizing effects of the drouth. 2. With elections out of the way, farmers have a better idea of what the government's farm policy will be the next few years. 3. Price resistance is weakening because farmers can no longer afford to hold back on replacement needs. 4. Farmers are adjusting to peacetime production and can make plans for a realistic market.

Fair and Warmer—Manufacturers generally are optimistic about the outlook for 1957.

Paul E. Herschel Jr., president, R. Herschel Mfg. Co., Peoria, Ill., and president of the Farm Equipment Institute, comments that most farm equipment manufacturers generally are reporting an improved outlook for sales. He cites the realization by farmers that more modern machinery helps reduce production costs and that the upward trend in labor costs makes

mechanization all the more profitable.

Sales 10 to 20 per cent better than 1956's are anticipated by Deere & Co., Moline, Ill., if weather and moisture conditions are favorable. William A. Hewitt, president, states that the improved outlook is based partly on the 5 per cent price increase established late last year and partly on the belief that cash receipts from farm marketings and government payments will be 3 to 5 per cent higher this year.

Henry S. Reddig, president, Minneapolis-Moline Co., Minneapolis, isn't disturbed by the slow first quarter and still expects a sales gain of 5 to 10 per cent this year.

R. S. Stevenson, president, Allis-Chalmers Mfg. Co., Milwaukee, thinks that 1957 sales should exceed 1956's. Factors in this, he thinks, will be the delayed purchases of equipment, slightly rising farm income and the improved weather outlook.

Good sales prospects for this year are pictured by Caterpillar Tractor Co., Peoria, Ill., because farm income is moving up and a machinery replacement requirement exists on many farms. Carl L. Hecker, executive vice president, Oliver Corp., Chicago, says average tractor life is estimated at 10 to 12 years. It is inevitable that equipment sold in the early postwar years must be replaced. So this market alone calls for production equal to that era's.

Leaders — Types of machinery selling best this year: New tractors with power steering and other power applications, balers and forage harvesters to produce more home grown animal feeds and reduce supplemental feeding, tillage and planting tools, fertilizer equipment and irrigation machinery. Corn combines probably will get increased attention.

George C. Delp, president, New Holland Machine Co., New Holland, Pa., notes the special interest in equipment like the crop dryer which helps the farmer produce a much higher quality hay. Frank H. Hamlin, president, Papec Machine Co., Shortsville, N.Y., mentions a relatively new technique — plow-planting corn — that can make a new market for several equipment companies. Plow-planted land is not cultivated. If weeds get too bad, they can be sprayed.

Merritt D. Hill, general manager, Tractor & Implement Division, Ford Motor Co., Dearborn, Mich., looks for a moderate improvement in tractor and farm implement sales this year. Although this expected upturn is slow in developing because of adverse weather conditions, he is sure the coming of warm weather will stimulate retail sales substantially.

Weather — Drouth has been a critical factor, especially in the extreme West and Southwest, where equipment buying has been off as much as 50 per cent. Combine sales may be off as much as 30 per cent. Tractor sales have been hit, too, but to a lesser extent.

No question about it, drouth hurt severely a year ago, but few dealers in the low-moisture areas were forced out of business. Sales are improving in these states, and the worst seems to be over.

Imports and exports will have little influence on the 1957 farm equipment picture.

Imports are a minor factor in the U.S. farm machinery market, although a few companies find it an important facet of their operations. There is a trend toward bigger imports, and they could be significant in a few years. Much foreign-made machinery, say some American manufacturers, is inferior in design and construction.

Overseas — The potential for American-built equipment in export trade is substantial, although the market is off drastically from the pace of former years. Operating against it are dollar shortages and the efforts of foreign companies to become industrially self-sufficient. John L. McCaffrey, chairman, International Harvester Co., Chicago, doesn't see much gain in exports of American-built equipment. There is, he says, the perennial problem of dollar exchange. Another facet: Production overseas has expanded greatly, both on the part of local manufacturers and subsidiaries of U.S. companies.

Dollars — STEEL predicts farm equipment shipments will pass the $1.7 billion figure this year. This is an approximate 10 per cent increase over last year but falls short of 1951, 1952, 1953, 1954 and 1955 totals.

Sees Electric Sales Increase

Prospects are bright for the electrical manufacturing industry in the opinion of Robert C. Graves, vice president, sales, Federal Pacific Electric Co., Newark, N. J. He forecasts high level of sales for his company and the industry.

"Starting from a base of the highest backlog in the company's history, we expect a continuing increase in sales as a result of the good level of activity in key markets," he said. "This is despite evidence of some soft spots in our highly complex national economy."

Three principal factors must be considered when forecasting operations, Mr. Graves said: 1. Capital spending of business. 2. Expansion by electrical utilities. 3. Trends in residential building.

"Each factor supports cautious optimism for electrical manufacturers for the second quarter of this year," he said.

Terming 1956 business "a fabulous spurt," Mr. Graves added: "There has been no appreciable slowing in 1957." He said sales for his firm during January were 20 per cent over those of the same period in 1956.

Engineer Students Increase

More engineers are in the making. The American Society for Engineering Education reports that more students are preparing for engineering careers this year than at any time since 1948.

Some 243,000 engineering students were enrolled in accredited colleges last fall, according to the U.S. Office of Education. Senior students this year total 28,256, an increase of 20 per cent over the number graduated in 1956.

Approves Export of Reactors

The Atomic Energy Commission has issued a license to AMF Atomics Inc., New York, for the export of a research reactor to West Germany. AEC has also announced that licenses will be issued to Foster Wheeler Corp., New York, and Loretz & Co., Los Angeles, for export of two research reactors to the Danish Atomic Energy Commission, Copenhagen.

We eliminated the need for drill jigs with a BULLARD Spacer Table

One of the leading manufacturers of machinery and equipment for the mining industry, employs the Bullard Spacer Table to locate parts for drilling, reaming and tapping.

According to the Assistant Factory Superintendent, "the Bullard Spacer Table eliminates the need for layout and is more accurate thereby saving jig cost and re-work time."

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BRIDGEPORT 9, CONNECTICUT

Ford: From Ingot to Auto

The auto maker's steel division has completed a major overhaul. It now plans minor changes to bring facilities to top condition. Eventually, Ford will buy more steel outside

FORD MOTOR CO. will be buying more steel from outside sources.

Its car production facilities are growing faster than its steelmaking capacity. Little room is left for steel expansion at the Rouge, and it's not likely Ford will try to duplicate the setup elsewhere.

Cheers—This should be happy news for the steel industry. Ford is ranked as the 12th largest ingot producer in the country. Annual ingot capacity is 1.8 million tons. Policy prohibits the release of current operating rates.

The division traditionally turns out 50 per cent of the steel used by its parent company. As a result, the Rouge plant must keep its steel prices competitive, but it faces a peculiar labor situation which makes this a constant balancing act.

Union—Hourly employees in the steel division belong to the auto workers' union (UAW Local 600) instead of the United Steelworkers of America.

This means they get wage increases and contract benefits with auto workers rather than steel workers.

Example—When the UAW negotiated its last contract in 1955, the steel division granted auto worker benefits to employees but had to keep steel prices the same as outside producers.

Last year, the division was left out of USA bargaining and continued to operate during the steel strike. This makes for a topsy-turvy life as far as Ford steelmen are concerned.

Changes—To keep up with the times, the division is rounding out its modernization program.

Last year, Ford's steel plant completed a five-year modernization and expansion program costing $55 million. A new sintering plant was built, soaking pits and coke ovens added and modern annealing furnaces installed.

Improvements were made to by-product facilities, and a new pig casting unit was constructed. New ingot stripper facilities were added. Blooming and hot strip mills were modernized.

This Year—The division is continuing with a series of smaller changes. William J. Reilly, division general manager, explains: "These are the sort any mill has to make constantly if it's going to stay modern."

No official figures are available, but an unofficial estimate puts the cost of these projects at close to $10 million.

Refining—In the works this year are plans to scrap Ford's by-product coke oven light oil refining plant and the installation of a distillation plant which will produce only crude light oil.

Carl A. Baumann, manager of the division's plant and production engineering department, points out that most of the division's present light oil goes to refiners who process and sell the products to paint, varnish, lacquer and plastic industries.

In another by-product phase, Ford has converted from production of ammonium sulphate to diammonium phosphate (DAP) for fertilizer.

Pollution—Signs of stronger antipollution pressure in the Detroit area have been increasing. Ford recently installed what it calls a

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STEEL'S ROAD TEST RESULTS

Model	Weight in lb	Hp/Rpm	Price*	Gas Consumption mpg Town	Highway	Speed Trials Average in seconds 0-60	0-30	45-65	Brake Fade**
Cadillac Sedan de Ville	4755	300/4800	$5539	10.9	13.6	12	4.8	6.3	8 stops
Lincoln Premier	4620	300/4800	5161	10	12.5	12.2	6.4	7.5	9
Chrysler Crown Imperial	4715	325/4600	5324	9.7	11.5	11	5.1	5.5	9

*Approximate price does not include shipping charges or accessories.
**Number of stops on 0-60 mph runs before brakes fade completely.

In case you're in a spring buying mood . . .

Lincoln offers a smooth ride, plenty of gadgets. *Cadillac's* ride isn't quite so good, but car feels solid and dependable—it's easy to handle. You don't need a blueprint to find the controls. *Chrysler* has best economy, and Torsion-Aire springing makes for soft ride. Body construction is not the greatest—still has rattles. Any of these cars will exceed 115 mph.

bacteria farm on a pilot basis.

A 30-ft tower, filled with corrugated plastic filter sheets, has been built for biological treatment of coke oven by-product phenolic wastes. The division also has installed mill scale and oil reclamation facilities in a further effort to eliminate stream pollution.

Pickled — In the mill, an overhead pickling line has been completely covered and modernized.

Experimental oxygen lances have been installed on one of the ten open hearth furnaces to determine if heat time can be reduced.

A 6000-hp motor has been put into operation on the bar mill.

Straddled—Like other steelmakers, Ford has concluded that material handling is one of the biggest areas for saving.

The division has moved to the use of straddle and fork lift trucks to handle finished steel.

Five 50,000-lb capacity straddle trucks move finished steel from the rolling mill to a warehouse or directly to manufacturing areas in the Rouge. The trucks are radio dispatched.

Odds 'n' Ends—Other changes include modern coal breakers and dust collectors as well as a coke and coal testing laboratory.

While each of these changes is minor, they typify Ford's attitude toward steelmaking: "We are going to be one of the most efficient steel plants in the country."

Steel Buying Wiggles Up

Detroit area mills are noticing a slight increase in orders for cold and hot-rolled strip and sheets. Delivery dates are late April, May and June.

Most are coming from automotive suppliers who are getting edgy about the low inventory position of the car companies. They want to be in on the ground floor if car builders decide to rush the market.

There still are no indications this will happen, and the mills warn that June cancellations still can come in.

Some steels are in a slump. Orders for tubing from independent producers are off as much as 15 per cent. Captive operations seem to be supplying all needs.

Stainless demand still is down, but a couple of mill salesmen "feel" it might buck up a bit by the end of the month.

Outlook: Buying continues slow, with no immediate signs of a big increase. If small buyers get jumpy enough, they could start a mild stampede, but it won't affect car company buying plans.

Lincoln Opens Novi Plant

Lincoln Division, Ford Motor Co., officially opens its Novi, Mich., plant today (Apr. 15). The move sets up Lincoln as a completely independent division with its own offices and manufacturing facilities in one location.

Hailed as one of the largest and most modern auto assembly plants, the operation has 1.3 million sq ft of manufacturing space and 35 acres under roof.

Painting lines are on a second floor to avoid fire and flashback throughout the plant.

The plant can turn out 112,000 cars a year on a straight time (two-shift) basis.

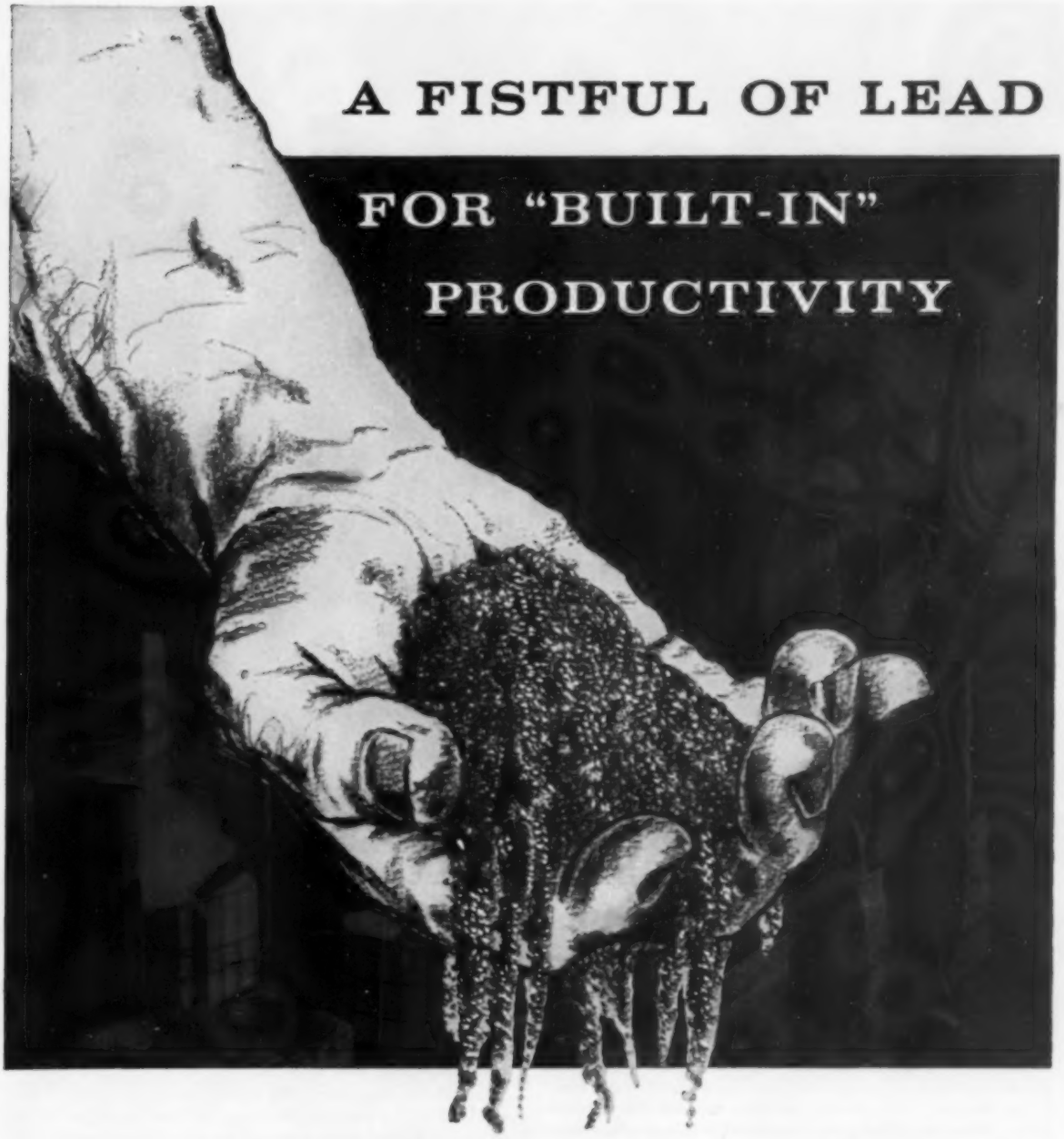
U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
3 Mo. Total	1,792,013	1,742,934
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Mar. 9	140,161	132,840
Mar. 16	141,038	131,207
Mar. 23	138,646	131,287
Mar. 30	130,233	125,850
Apr. 6	132,522†	129,829
Apr. 13	132,000*	136,038

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.



Controlled additions of lead, introduced when the ingots are teemed, produce steel with vastly superior machining qualities compared to same steel unleaded. Leaded alloy and carbon are freer machining, permit faster feeds and speeds and greatly increase tool life. They cut clean and with a fine finish which frequently eliminates the final machining operation. These better machining qualities add up to a kind of "built-in" productivity that can mean substantial production line savings for you.

If you would like to see for yourself what "built-in" productivity can mean in your operation, ask us to lead half of your next Aristoloy order. Our field metallurgist is also at your disposal—ready to work with you in selecting the best leaded grade for the job.

For complete information, call the Copperweld office in your nearest major city, or write direct.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY

Steel Division • Warren, Ohio

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

Graph-Mo® dies cut downtime 50% on deep draw for round vacuum cleaner!

ENGINEERS at The Hoover Company had a tough problem in getting that round vacuum cleaner shape in the new Constellation. The two circular dies that form the hemispheres often galled, picking up bits of the steel being formed. This scored the dies, marred the finished parts. Production had to be shut down while the dies were repolished. And extra polishing of the hemispheres ran up costs still more.

After studying the problem, Timken Company metallurgists recommended dies made from Graph-Mo®—a special tool steel developed by the Timken Company. Results were outstanding. The new Graph-Mo dies cut downtime 50%. The combination of free graphite particles and diamond hard carbides in its structure make it outwear other tool steels 3 to 1. Production rolled smoothly and refinishing time was cut.

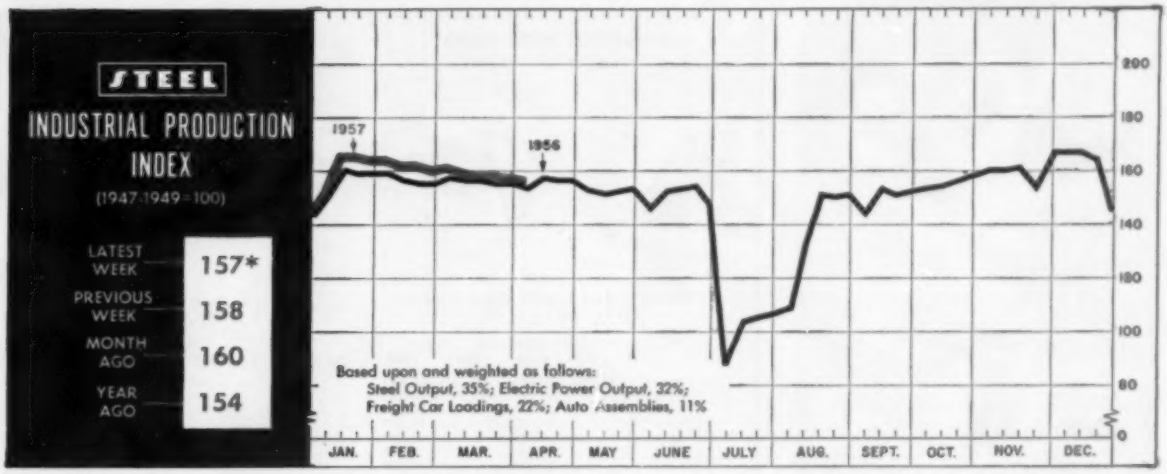
Graph-Mo machines 30% easier than conventional tool steels. And its uniform response to heat treatment eliminates distortion—saves time and money in lots of tough jobs.

Graph-Mo is one of four graphitic tool steels developed by the Timken Company. If you would like more information about their uses in dies, punches, gages and machine parts, send for the new Timken Graphitic Steel Book. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U.S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



Week ended Apr. 6.

Sales Still Rising, But Profits Lag

"PROFIT SQUEEZE" will be an even more familiar phrase in 1957 than it was in 1956 if the pattern set in first quarter holds throughout the year. Of 45 metalworking companies announcing preliminary figures or estimates for the first quarter, 30 say sales will be as good as or better than the corresponding quarter of last year. Only 25 expect profits to follow suit.

The companies, ranging from steel producers to fabricators and suppliers of chemicals to metalworking, generally see a prosperous year. But almost all express concern about the rising cost of doing business. Even most of those expecting increased profits say the margin will not match the sales increase.

Varied Reasons—A look at the causes behind the first quarter pattern gives an even deeper insight into the rolling adjustment within the economy which is becoming accepted as normal. Steel producers, while currently operating at about 90 per cent of capacity, are banking on more efficient production and elimination of some costly overtime coupled with higher prices for steel. Tonnage may be down, but profits aren't. Nonferrous companies are hit by the double-barreled shot of reduced demand and lower prices for some metals, especially copper.

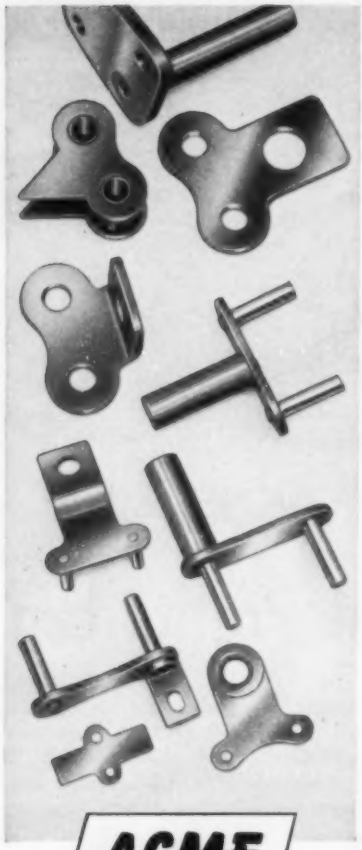
Makers of appliances and other goods for the home are hurt by the lower rate of housing starts and, in some cases, competitive pressures on prices. But manufacturers of such growth items as air conditioners and automatic laundry equipment are faring better than producers of television sets and kitchen appliances.

Peaking—Heavy equipment producers are still riding on the expansion wave. Of the 13 included in this study, only one reported a decline in sales for first quarter. The reason was a strike at a

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,328[1]	2,319	2,483
Electric Power Distributed (million kw-hr)	11,700[1]	11,694	10,846
Bituminous Coal Output (1000 tons)	10,565[1]	10,260	10,311
Petroleum Production (daily avg—1000 bbl)	7,700[1]	7,786	7,171
Construction Volume (*ENR*—millions)	$281.5	$359.0	$276.5
Auto, Truck Output, U. S., Canada (*Ward's*)	167,538[1]	164,151	170,867
TRADE			
Freight Car Loadings (1000 cars)	680[1]	695	685
Business Failures (Dun & Bradstreet)	290	318	263
Currency in Circulation (millions)[3]	$30,588	$30,502	$30,321
Dept. Store Sales (changes from year ago)[3]	−8%	+1%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,984	$22,805	$20,623
Federal Gross Debt (billions)	$274.9	$272.0	$276.3
Bond Volume, NYSE (millions)	$19.4	$17.7	$24.9
Stocks Sales, NYSE (thousands of shares)	9,741	8,549	14,194
Loans and Investments (billions)[4]	$85.6	$86.7	$85.6
U. S. Govt. Obligations Held (billions)[4]	$25.2	$26.0	$28.0
PRICES			
STEEL's Finished Steel Price Index[5]	227.41	227.41	209.10
STEEL's Nonferrous Metal Price Index[6]	239.1	239.3	278.2
All Commodities[7]	116.9	117.0	113.5
Commodities Other Than Farm & Foods[7]	125.3	125.3	121.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,539,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



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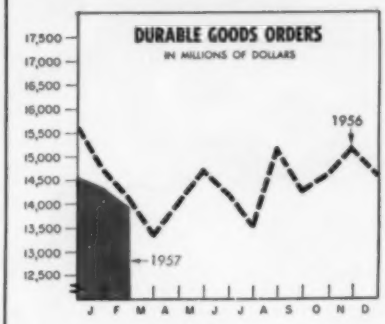
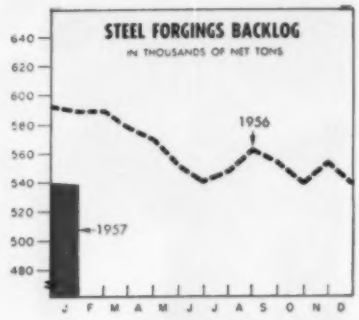
THE BUSINESS TREND



	New Orders* 1957	New Orders* 1956	Sales* 1957	Sales* 1956
Jan.	14,389	14,683	14,607	13,595
Feb.	13,900†	14,107	14,700†	13,593
Mar.	.....	13,337	.....	13,294
Apr.	.....	14,073	.....	13,519
May	.....	14,732	.....	13,754
June	.....	14,185	.....	13,850
July	.....	13,513	.....	12,627
Aug.	.....	15,166	.....	13,665
Sept.	.....	14,266	.....	13,692
Oct.	.....	14,591	.....	14,199
Nov.	.....	15,130	.....	14,321
Dec.	.....	14,544	.....	14,507

*Seasonally adjusted. †Preliminary.
U.S. Office of Business Economics.

Charts copyright, 1957, STEEL.



	Shipments 1957	Shipments 1956	Unfilled Orders 1957	Unfilled Orders 1956
Jan.	148	160	537	589
Feb.	...	152	...	589
Mar.	...	159	...	578
Apr.	...	150	...	569
May	...	151	...	551
June	...	143	...	540
July	...	98	...	547
Aug.	...	123	...	562
Sept.	...	121	...	554
Oct.	...	148	...	539
Nov.	...	135	...	553
Dec.	...	130	...	538

U.S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

supplier's plant. This group showed the best profit picture. There is much talk about a leveling off or slight downturn in both sales and profits toward year end.

Fastener makers are worried about the rising cost of steel, but the sampling shows that sales and earnings are still on the upswing. Producers of chemicals show a mixed pattern, largely depending on what industries they serve.

In the Pinch—Component makers are doing all right on sales, but their profits are feeling the pinch between rising costs and pressure from buyers.

These are not all the companies or all the reasons for their performances. But they seem to fortify the trend established by the 1956 annual reports—even in a good year, it's hard to make a dollar.

Index Faces Stern Test

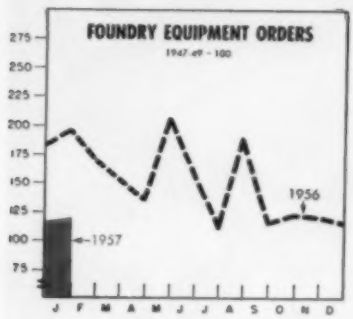
This is the month in which STEEL's industrial production index will be put to its first real test of 1957. Until now, the trend line has followed a course almost identical to that of 1956 but 2 to 4 points higher. The general direction has been sidewise, with an easing of only nine points in 13 weeks. To maintain its superiority over the comparable year-ago period, the weekly average in April will have to rise above the March average of 159.6 (1947-1949=100).

Chances are 50-50 that this will happen. Not much help can be expected from the steel industry until late in the month. On the other hand, steel operations won't be much of a depressant. They are expected to remain about as is—around 90 per cent of capacity—until a rush to beat price increases sets in.

Output of electric energy should maintain its edge of 5 to 8 per cent over a year ago, which will add strength to the index on a comparative basis.

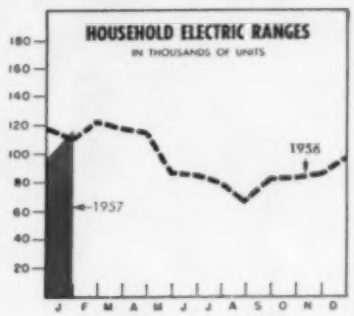
Auto output still depends on the outcome of the spring selling campaign. Sales contests and better weather pushed the daily average in the Mar. 21-31 period to the best level since 1955, says *Ward's Automotive Reports*. If this continues, a boost in car assemblies will follow.

Car loadings remain the big question. They are still trailing the corresponding figures for last year. Estimates by the 13 regional shippers advisory boards indicate that



	1957	1956	1955
Jan.	117.9	195.6	81.0
Feb.	....	169.0	90.4
Mar.	....	152.7	163.6
Apr.	....	135.2	178.6
May	....	207.0	145.7
June	....	156.7	186.8
July	....	110.3	213.4
Aug.	....	188.3	134.0
Sept.	....	114.7	156.7
Oct.	....	122.2	108.6
Nov.	....	121.0	154.4
Dec.	....	115.6	183.9

Foundry Equipment Mfrs. Assn.



Total Factory Sales—Units

	1957	1956	1955
Jan.	116,600	110,140	136,663
Feb.	.....	122,514	127,188
Mar.	.....	117,544	130,180
Apr.	.....	114,619	108,619
May	.....	85,977	109,263
June	.....	84,562	105,088
July	.....	79,766	85,629
Aug.	.....	64,826	76,158
Sept.	.....	82,385	101,100
Oct.	.....	82,700	103,610
Nov.	.....	85,600	88,290
Dec.	.....	96,400	118,161
Totals	.....	1,200,000	1,289,949

National Electrical Mfrs. Assn.

loadings during the second quarter will be 0.4 per cent above the 1956 quarter, according to the Association of American Railroads. If that prediction materializes, it will mean an improvement of about 100,000 cars a week over the first quarter and will give strength to the index. However, it must be noted that shippers were overoptimistic in the prediction for first quarter.

Construction: Slow Quarter

One trend that is going to need more than good weather for a remedy is in construction. Through first quarter, heavy construction contracts lagged 21 per cent behind the 1956 pace, reports *Engineering News-Record*. The dollar volume of $4.6 billion is still second best for the quarter, topped only by last year's figure. This indicates the difficulty in making any comparison with "the best." Just one year ago, the total would have looked impressive. Today it's just so-so.

New Orders Slough Off

For the second month in a row, new orders for durable goods, seasonally adjusted, in February ran behind the year-ago figures (see chart, page 94), reports the Office of Business Economics. At the same time, sales (equivalent to production) are running at record heights. This results in a decline of unfilled orders from $59.3 billion to $58.9 billion. The difference between now and a year ago in new business is not great, but it indicates the leveling-off process is under way. However, seasonal factors play an unpredictable part in business during first quarter, so the trend could be reversed with the coming of spring.

Trends Fore and Aft

• Personal income in February was at an annual rate of $336.5 billion, says the Office of Business Economics. During the first two months of 1957, the rate was 6 per cent higher than it was in the comparable period of 1956.

• Indicative of the increase in federal spending is the rise in Department of Defense military electronics expenditures. They jumped from $632.6 million in the first quarter of the fiscal year to $903.7 million in the second quarter, reports the Radio-Electronics-Television Manufacturers Association.

KNOW Mississippi

We cordially invite you to read this important message from Mississippi's Governor J. P. Coleman.

Metal working plants can prosper in Mississippi . . .

There's a good climate for industrial growth down in Mississippi. Under our State's famed BAWI program we can finance your new metal working plant in a community of your own choosing, and grant you tax exemptions of five to ten years.

Every effort is made by the Governor, the Legislature and all responsible State officials to operate our State government on such a high plane of service, stability and economy as to leave no doubt in the minds of industrialists of the nation that Mississippi is a sound, safe and outstanding place in which to locate and operate —a place where they will receive fair and equitable treatment under sane and just laws.

Mississippi offers industrial enterprises the happy combination for a profitable plant operation — proximity to *markets*, a wealth of *materials*, and an adequate reservoir of *manpower*.

Would you like to know Mississippi's potential for your new plant? Please write me for the facts you need. We want you to know Mississippi.

J. P. Coleman
GOVERNOR OF MISSISSIPPI

Mississippi Agricultural & Industrial Board
STATE OFFICE BUILDING
JACKSON, MISSISSIPPI

THE BAWI STATE

Engineered by Tinnerman...

4 SPEED NUTS® eliminate 8 parts in resistor assembly, cut costs 50%!

Tremendous assembly savings are often possible when Tinnerman SPEED NUTS are "designed into" new products. This is an example: Corning Glass Works, Corning, New York, adopted 4 special SPEED NUT brand fasteners and cut assembly costs on new power-type glass resistors by 50%!

Assembling power resistors is normally a slow and complex operation. Yet a pair of one-piece, spring-steel SPEED NUT angle brackets eliminated 4 of the 9 parts required by another fastening method and cut assembly time to a few seconds!

These corrosion-resistant, vibration-proof fasteners hold the resistor under live spring tension to avoid mechanical shock. Locating washers, lock washers and nuts are eliminated. Also, one-piece SPEED CLAMPS® that double as terminal bands eliminate 2 lock washers and 2 nuts.

SPEED NUTS permit maximum assembly savings on *new* products, but you can probably make worthwhile savings *right now* on current products.

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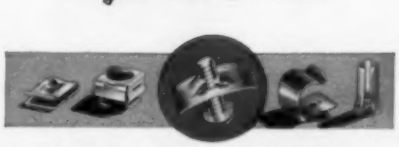

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HENRY R. MERRILL
Behr-Manning v. p.-sales

JOSEPH N. KEMPLE
Page Steel & Wire sales mgr.

WILLIAM D. ROSS
Tourek Mfg. president

M. NIELSEN
Babcock & Wilcox president

Henry R. Merrill, general sales manager, **Behr-Manning Co.,** Troy, N. Y., division of Norton Co., was elected vice president-sales.

Joseph N. Kemple was made sales manager, **Page Steel & Wire Division,** American Chain & Cable Co. Inc., Monessen, Pa. He succeeds **W. H. Bleeker,** retired. Mr. Kemple was manager, wire rope and electrical wire sales, Columbia-Geneva Steel Division, U.S. Steel Corp.

Sherman M. Fairchild, founder and chairman of **Fairchild Camera & Instrument Corp.,** Syosset, N. Y., becomes president to succeed **John M. Clough,** resigned.

Snyder Tool & Engineering Co., Detroit, appointed **Leo P. Gajda** vice president-engineering; **Bruce M. Regan,** vice president-manufacturing.

Baldwin - Lima - Hamilton Corp. named **A. J. Yorgiadis** and **A. U. Kutsay** to head a new department at its electronics and instrumentation division, Waltham, Mass. Mr. Yorgiadis will be product manager and chief engineer; Mr. Kutsay, assistant chief engineer of the department—to be known as the dynamics products group.

Wesley Timmcke was named manager of engineering, industrial division, **Warner Electric Brake & Clutch Co.,** Beloit, Wis.

Earl D. Riner was made vice president and general manager, **Bell Automation Corp.,** Rochester, N. Y., subsidiary of Bell Aircraft Corp.

William D. Ross was elected president, **J. J. Tourek Mfg. Co.,** Chicago. He was vice president-manufacturing. **R. A. Burritt** was made vice president and factory manager. He was assistant general factory manager of Chicago Screw Co.

Ronald S. Yale was made products sponsor for sheet and strip sales at the Milwaukee plant of **Joseph T. Ryerson & Son Inc.**

Russell R. Sanger was made vice president and general manager, **Baldwin Mfg. Co.,** Toledo, O.

H. Merle Hanford was made manager, air-hydraulic division, **R. C. Neal Co.,** Buffalo.

Raymond W. Naus was appointed sales manager, **Pressco Casting & Mfg. Corp.,** Chesterton, Ind. **Ben Pethe** was made chief draftsman.

Malcolm F. Judkins was made director, new product development, **Firth Sterling Inc.,** Pittsburgh.

Mort Lenk was elected vice president-sales manager, **Lenk Mfg. Co.,** Boston.

Rem-Cru Titanium Inc., Midland, Pa., appointed **Robert L. Rudolph** chief chemist in its quality control department.

Merle W. McLaughlin was elected vice president - manufacturing, **Copeland Refrigeration Corp.,** Sidney, O. He was general manager of the Traverse City, Mich., division of F. L. Jacobs Co.

M. Nielsen was elected president, **Babcock & Wilcox Co.,** New York. He was executive vice president. He succeeds **Alfred Iddles,** retired.

Rex D. Cross was made vice president and general manager, **Unique Balance Co.,** Stamford, Conn. He recently resigned as vice president-general manager, Laclede-Christy Division, H. K. Porter Company Inc.

Ralph M. Buzard, sales manager, motor truck division, **International Harvester Co.,** Chicago, was appointed general manager of that division. He is succeeded by **Louis W. Pierson. William E. Callahan** was made assistant sales manager.

Gardner-Denver Co., Quincy, Ill., elected as vice presidents: **George Gutekunst,** general sales manager, Denver plant; **B. D. Maddox,** general manager, Keller Tool Division.

J. Stuart Woolley was named purchasing agent for the new industrial fork lift truck manufacturing plant of **Yale & Towne Mfg. Co.** at San Leandro, Calif.

Harry J. Camillery was elected vice president, **Fairview Foundry Inc.,** Poughkeepsie, N. Y.

Charles C. Warne Jr. was made vice president-sales, electrical materials and aluminum products, **Hubbard & Co.,** Pittsburgh. He has been vice president-general manager, aluminum products sales and manufacturing operations.

Robert A. Hamilton was made as-

ARTHUR T. WEST

R. D. LINDSTROM

National Tool executives

MARCUS J. AURELIUS

M. M. CHAPMAN

U.S. Steel executive positions

sistant to the president of **Howell Electric Motors Co.**, Howell, Mich.

National Tool Co., Cleveland, elected **Arthur T. West** president; **R. D. Lindstrom**, vice president and general manager.

M. L. Bernstein was made assistant general manager, Steubenville, O., Works, **Wheeling Steel Corp. C. W. Drabers** was made superintendent, open hearth department; **G. P. Whitaker Jr.**, assistant superintendent-open hearth department. **L. W. Moore** was named assistant to the general manager, utilities and development.

Glenn C. Lechleitner was made an assistant sales manager, in charge of estimating and proposals for **Clearing Machine Corp.'s** Hamilton presses. He is at Chicago. Before joining Clearing, division of U.S. Industries Inc., he was general manager at Cleveland Punch & Shear Works.

William V. Crowley was made sales manager, western division, **Alwac Corp.**, Hawthorne, Calif. He was at North American Aviation Inc.

John D. Saint-Amour was elected president, **Assembly Products Inc.**, Chesterland, O. **Robert H. Pugsley** was made vice president-sales manager. **Bradley R. Thompson**, former president and sales manager, is now chairman.

Westinghouse Electric Corp. elected **Carroll V. Roseberry** vice president and appointed him manager, midwestern region, with headquarters in Chicago. He succeeds **A. M. Fisher**, who, for reasons of health, has asked to be relieved of the regional duties, and has been made Minneapolis district manager. Mr. Roseberry was manager of Westinghouse's commercial atomic activities in Pittsburgh.

Gustaf R. Young was promoted to director of manufacturing operations of **Malleable Iron Fittings Co.**, Branford, Conn. He was general superintendent. **Ogden W. Sutro** was made director of sales and marketing.

Sam F. Arn was made general sales manager, **Gertsch Products Inc.**, Los Angeles.

Ford Instrument Co., division of Sperry Rand Corp., Long Island City, N. Y., appointed **Robert J. Seymour** manager of product planning; **Edmund C. Bennett**, manager of the production test department; **Raymond R. Nadronza**, chief tool engineer.

Shelley S. Salyards succeeds **Louis J. Dame**, retired, as manager of the Schaefer plant, Detroit Mfg. & Engineering Division, **Burroughs Corp.**, Detroit.

Raymond A. Miller Jr. was made general plant manager at **Hawthorne Metal Products Co.**, Royal Oak, Mich.

Donald E. Fischer, formerly with Nordberg Mfg. Co., joined **Erie Mfg. Co.**, Milwaukee, as purchasing agent and office manager.

H. E. McPherson was made New York district sales manager, **Republic Steel Corp.**, to succeed **Edwin A. Regan**, who continues in an advisory capacity until retirement at midyear.

Marcus J. Aurelius was made an assistant executive vice president-commercial, **United States Steel Corp.**, Pittsburgh. He is succeeded by **M. M. Chapman** as vice president-sales. **Howard J. Mullin** succeeds Mr. Chapman as assistant vice president of sales-distribution. **J. M. Curto** replaces Mr. Mullin as New York district sales manager.

Richard W. Elder was made general sales co-ordinator of **National-Standard Co.**, Niles, Mich. He continues as manager of round wire and specialty sales.

Harland L. Printz was made superintendent of tooling for **Westinghouse Aviation Gas Turbine Division**, Kansas City, Mo., Westinghouse Electric Corp.

Lewis S. List was made manager, air appliance department, industrial divisions, **U.S. Hoffman Machinery Corp.**, New York. **Raymond Boyd Jr.** was made manager, industrial divisions and foreign operations.

F. R. Hook was made assistant general manager, **Ionia Mfg. Co.**, division of Mitchell-Bentley Corp., Ionia, Mich.

Arnold W. Asman was made product manager of mining equipment sales, **Hewitt-Robins Inc.**, Stamford, Conn. He succeeds **R. U. Jackson**, scheduled for retirement in 1959. Until that time, Mr. Jackson will be assigned to the sale of large conveyor contracts and will be a consultant on mining problems.

Calvert Iron Works Inc., Atlanta, elected **Edwin F. Chobot** president and treasurer; **Mrs. R. A. Calvert**,

NEW CEMCO

ALUMINUM "EX-BAR" FOR STEEL INGOT DEOXIDIZING

Increases Ingot Yield
Maintains Uniform Aluminum Residual
Reduces Inclusions, Slivers and Aluminum Consumption

Cemco's New Aluminum "Ex-Bar" was developed especially for deoxidizing steel in the ingot mold. Its special design* and method of use* (patent pending) dissolves and diffuses aluminum uniformly, without wasting or burning, as fast as the ingot mold is filled. Made in three different dimensional sizes and in any length, "Ex-Bars" can satisfy any mold size just by varying the length of the bars.

For Full Details Write

TEST RESULTS
CEMCO "EX-BAR"*

- Increased Ingot to Slab Yield
- Increased Ingot to Sheet Yield
- Cleaner Ingot Surface
- Reduction in Test Cut Inclusions, from over 100 to Less than 10
- Residual Aluminum, Uniform and Easily Predicted
- Reduction of 33% in Aluminum Required

**Patent Pending*

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Carondelet Foundry sales

GORDON N. DOW
Leschen gen. sales mgr.

RICHARD C. CUNNINGHAM
Eastern Stainless sales dir.

W. J. WOOLLEY
Henry Pratt exec. v. p.

FREDERIC S. CLAGHORN
Fletcher Foundry sales mgr.

PAUL H. KRUEGER
Hays Corp. mfg.-manager

chairman; **Sterling P. Eaves** and **William S. Young,** vice presidents.

W. J. Woolley, vice president-sales, was promoted to executive vice president, **Henry Pratt Co.,** Chicago. **J. L. Nelson** was made manager of the Dixon, Ill., plant. **Donald Steder** was made supervisor, valve service and quality control.

Frederic S. Claghorn was promoted to sales manager, **Fletcher Foundry Division,** Fletcher Works Inc., Philadelphia. He was sales manager, centrifugal division.

At General Dynamics Corp.'s **Convair Division,** Ft. Worth, Tex., **Vinko Dolson,** development manager, was appointed factory manager to succeed **Kermit A. Day,** resigned. **Gus S. Green** succeeds Mr. Dolson.

William S. Morrison succeeds **George W. Wolf,** retired, as president, **United States Steel Export Co.,** New York, subsidiary of U.S. Steel Corp. Mr. Morrison was vice president-commercial for the export firm.

Paul H. Krueger was appointed manager of manufacturing at **Hays Corp.,** Michigan City, Ind.

George C. Jennings was made New York district sales manager, **Wickwire Spencer Steel Division,** Colorado Fuel & Iron Corp. He succeeds **C. K. Pattison,** now on special assignment.

Charles F. Menzer was made works manager, **Alloy Steel Casting Co.,** Southampton, Pa. He was chief quality control engineer at Cooper Alloy Co.

Martin C. Falk was made chief engineer, **Steel Equipment Co.,** Cleveland. He was in charge of research and development at Yoder Co.

Robert P. Gira, general contracts manager for **Topp Industries Inc.,** Beverly Hills, Calif., was elected a vice president.

John R. Gochnour was named manager, steel packaging sales, **American Sisalkraft Corp.** He has headquarters in Pittsburgh.

Albert W. Gruer Jr. was appointed manager of sales and marketing, **Carondelet Foundry Co.,** St. Louis. He was director of marketing research with Cessna Aircraft Co.

Gordon N. Dow was made general sales manager, **Leschen Wire Rope Division,** H. K. Porter Company Inc., St. Louis. He was Chicago district sales manager.

Richard C. Cunningham succeeds **Edward A. Haggenmuller,** retired, as sales director of **Eastern Stainless Steel Corp.,** Baltimore. Mr. Cunningham was manager of stainless sales for Industrial Stainless Steels Inc., subsidiary.

Lee Wilson Engineering Co. Inc., Cleveland, appointed **E. A. Corns** administrative assistant for the Lee Wilson proprietorship operations. He is succeeded as director of research by **C. C. Blackman. R. R. Hill** replaces Mr. Blackman as assistant chief engineer. **G. C. Weaver,** plant superintendent, was named assistant production manager and plant superintendent. **J. R. Moran** was made assistant superintendent-service and construction; **E. P. Usiak,** combustion engineer; **W. T. Mittler,** assistant to Mr. Weaver.

OBITUARIES...

Charles L. Lewis, 58, president, **Lewis Tool & Mfg. Corp.,** Union, N. J., died Apr. 2.

Charles J. Reimer, 46, general purchasing agent, **SKF Industries Inc.,** Philadelphia, died Mar. 29.

George W. Proffitt, executive secretary, **Copper & Brass Warehouse Association,** Washington, died Mar. 30.

Harold G. Ratcliffe, 70, president, **Losch Boiler & Equipment Co. of Canada,** Toronto, Ont., died Mar. 28.

Ralph F. Burns, 59, manager of metal sales, western district, **New Jersey Zinc Co.,** New York, died Mar. 29.

David A. Hagberg, 57, regional sales manager for the pneumatic tool department of **Ingersoll-Rand Co.** in Buffalo, died Mar. 31.

"BUY-WORD" for TOOLS for 75 years...the WILLIAMS DISTRIBUTOR

In Early Industrial America

An adjustable wrench, such as this 125 year old relic, was a great advance in the tools of the times. This one was picked up in the Onondaga Valley about 1870 by Horace Erdreich (a peddler).

Supplying customers with tools of the trade from his wagon or trading store, the pioneer distributor established a service essential to the growth of many industries.

Today, Distribution Keys Production

Williams Superrenches® are typical of the functionally designed, precision-made tools in the "Broadest Line of Its Kind". To make these tools available promptly, economically and conveniently, Williams continues to work hand-in-hand

with the Industrial Distributor...adding to quality products all extra advantages provided by the Distributor.

Offering prompt, personal service, local Williams Distributors save valuable time and money in ordering, production and inventory. Perhaps even more important is a service rendered which can not be bought...IDEAS. Sound, practical ideas based upon a variety of outside experiences...unbiased and beneficial.

- **Reason enough, (and there are plenty more) why your best buy in tools is always through your Williams Distributor.**

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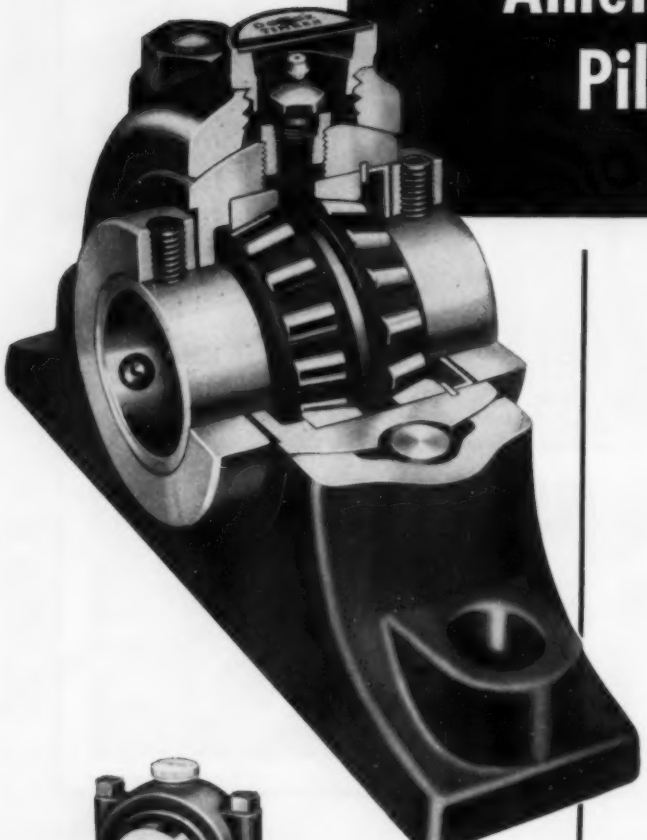
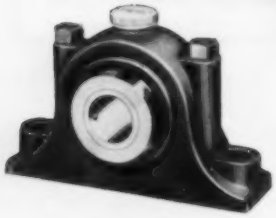
AVAILABLE IN FIVE TYPES
FOR ALL KINDS OF SERVICE

DODGE-TIMKEN
America's Quality Pillow Block





- COMPLETELY ASSEMBLED
- FACTORY ADJUSTED
- PRE-LUBRICATED

Call the Transmissioneer, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE-TIMKEN Bearings are adjusted, lubricated and sealed at the factory. Labrynth seals effectively retain the lubricant and prevent the entrance of dust and dirt. The inbuilt precision of Dodge-Timken Bearings is protected both on and off the shaft. They are delivered fully assembled, ready to mount.

Where service conditions are toughest Dodge-Timken Bearings prove their quality decisively. For superior performance, dependability and long life they have won their reputation throughout industry as America's quality pillow blocks.

To meet varying service requirements Dodge-Timken Pillow Blocks are available in five types—the type E..Double Interlock (illustrated)..Type C..Special Duty ...and All-Steel. Available in a range of shaft sizes from 1-3/16" to 10".

Call your Transmissioneer; or write for Bulletin A638 giving load ratings, dimensions and other data on Dodge-Timken Roller Bearings.

DODGE MANUFACTURING CORPORATION
4400 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

Truscon Adds Plant

Spends $3 million to expand bar joist and roof deck facilities. Creates 200 new jobs

TRUSCON STEEL Division of Republic Steel Corp. will expand its steel bar joist and roof deck facilities by taking over 171,000 sq ft of space in one of the corporation's buildings at Niles, O. Cost of the program: $3 million.

This move was necessary because of space limitations at Truscon's Youngstown plant. Youngstown will continue to make 8 to 40 ft long hot-rolled joists and 6 to 12 in. wide roof decks.

The Niles facility will produce 8 to 60 ft long cold-rolled joists and 24 in. wide roof decks.

Roof deck production is expected to begin in June and bar joist production by the end of the year. About 200 new jobs will be created.

New Link-Belt Bearing Plant

Link-Belt Co. will build a $5-million bearing plant at Indianapolis to replace and increase by 50 per cent the capacity of its present Dodge plant there. Construction will begin this year and is expected to be completed in 1958. Full production of antifriction bearings is expected in 1959. STEEL reported erroneously (Apr. 8, page 87) that the facility would make chain, sprockets and material handling equipment.

Will Build Research Center

Robertshaw-Fulton Controls Co. will build a $250,000 Western Research Center at Anaheim, Calif., for the study of automatic controls for air conditioning, home heating, water heating, cooking, food preservation and home laundry appliances.

GM, Reynolds To Be Neighbors

Massena, N. Y., will be the site of an industrial expansion program geared to the opening of the St. Lawrence Seaway. Reynolds Metals Co. will build an $88-million aluminum reduction plant at Massena which is scheduled to open in June, 1959. On an adjacent tract, General Motors Corp. will build a 213,000 sq-ft aluminum foundry which will make castings for the Chevrolet Division. Also scheduled for completion in June, 1959, it will provide employment for several hundred.

Trane Opens Five Warehouses

Trane Co., La Crosse, Wis., manufacturer of air conditioning and heating equipment, established regional warehouses in New York, Cleveland, Dallas, Kansas City, Mo., and Chattanooga, Tenn. They will be distribution centers for package air conditioners.

New Plant Makes New Line

Yale & Towne Mfg. Co.'s new plant at San Leandro, Calif., will produce an entirely new line of heavy duty gasoline fork lift trucks with load capacities up to 20,000 lb. Also scheduled for production at this $2.5-million facility are standard gas, LP-Gas, and electric-powered fork lift trucks, Worksavers and Warehousers. In August, the plant will begin production of the Trojan line of bulk material handling equipment. J. T. McCarley is plant manager.

Enters Precision Optics Field

Consolidated Electrodynamics Corp., Pasadena, Calif., formed a department to design and manufacture precision optics. Called the Spectron Division, it will occupy a 16,000 sq-ft building in Monrovia, Calif. R. L. Kiernan, formerly with Texas Instruments Inc., is manager.

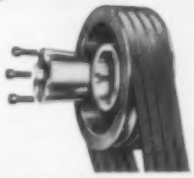
Foundry Adds Machine Shop

Waterbury Farrel Foundry & Machine Co. has begun construction of a machine shop and assembly bay for its new Cheshire, Conn., plant. The cost of this 50,000 sq-ft unit, including site improvements, machinery and equipment, will be about $2.5 million.

Boiler Plant To Close Doors

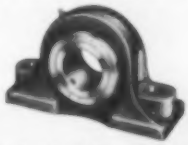
Kewanee Boiler Division of American Radiator & Standard Sanitary Corp. will discontinue

(*Please turn o page* 106)



TAPER-LOCK
SHEAVES
Easy on—easy off! Mount flush!

TAPER-LOCK
SPROCKETS
No reboring—no waiting!



SC AND SCM
BALL BEARING PILLOW BLOCKS
"The seal won't blow!"

Write for Bulletins!

- Taper-Lock Sheaves. Drive tables and technical data. Bulletin A-661
- Taper-Lock Sprocket and Dodge Roller Chain data. Bulletin A-644
- Rolling Bearings—SC, SCM and Dodge-Timken. Bulletin A-638

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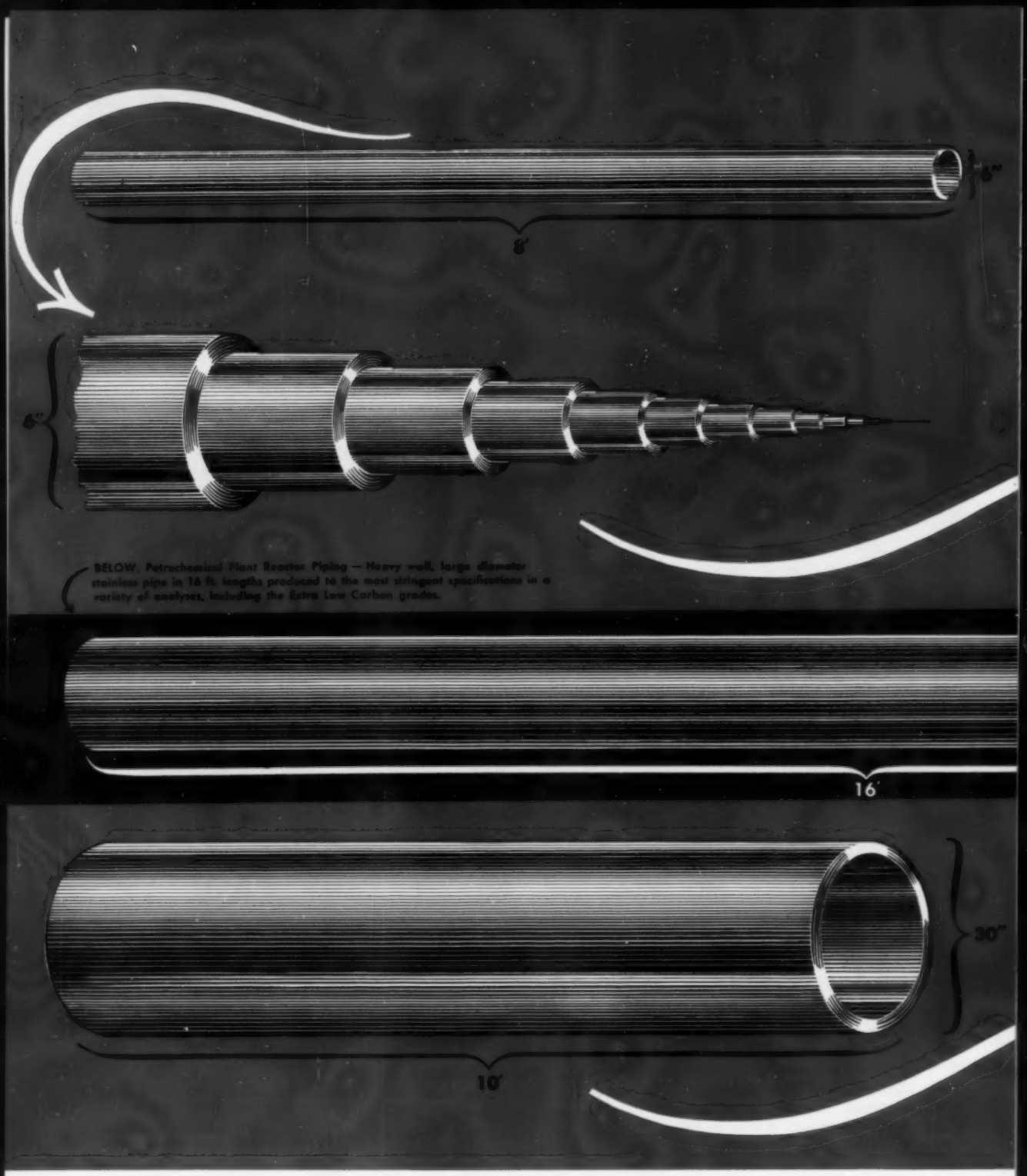
of Mishawaka, Ind.



BELOW. Petrochemical Plant Reactor Piping — Heavy wall, large diameter stainless pipe in 16 ft. lengths produced to the most stringent specifications in a variety of analyses, including the Extra Low Carbon grades.

UNITED STATES PIPE & FOUNDRY CO.

Steel and Tubes Division

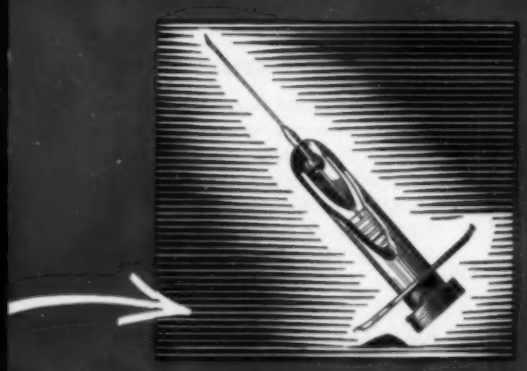
STEEL & TUBES · U.S. PIPE · DIVISION

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, SAN FRANCISCO, CHICAGO, ST. LOUIS, COLUMBUS, DETROIT, PITTSBURGH, HARTFORD, BURLINGTON

3 PROBLEMS
each different

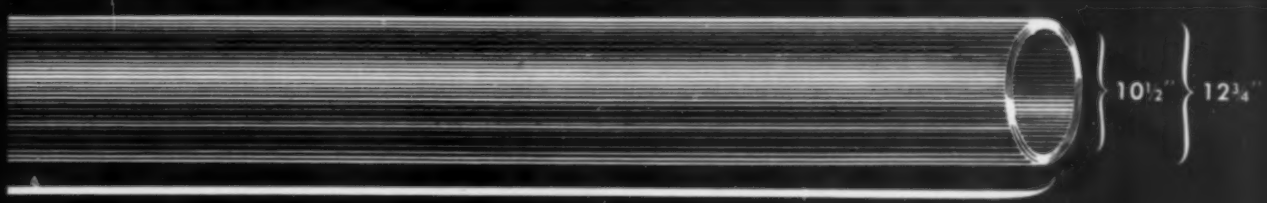
1 SOLUTION...
stainless steel
Centrifugal Castings

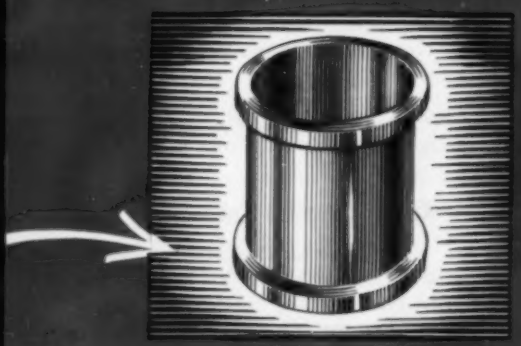


Hollow Billets for cold reducing into small diameter seamless tubing, even down to hypodermic needles—ultimate proof of metal soundness! Many so-called non-piercable grades of pipe and tubing can be hot or cold reduced from centrifugally cast billets.

Heavy Wall stainless steel pipe, centrifuge bowls, hollow billets for finely drawn hypodermic needle tubing . . .

These are among the many end uses for metal mold centrifugally cast cylindrical shapes. They are typical of the exacting, difficult service conditions to which this product is subjected. All three examples shown demonstrate the fundamental versatility of this manufacturing process—unequaled product soundness—from hypodermic needle stock subjected to the repeated stresses of cold reduction, to the centrifuge bowl spun





Centrifuge Bowl Shells produced from multiple length sections and machined to shape desired.

at 1800 RPM, to the petrochemical plant reactor piping that must pass hydrostatic pressure tests equal to 90% of the Yield Strength of the metal. These are the proving grounds of quality—of the ability to meet even the most exacting of product specifications.

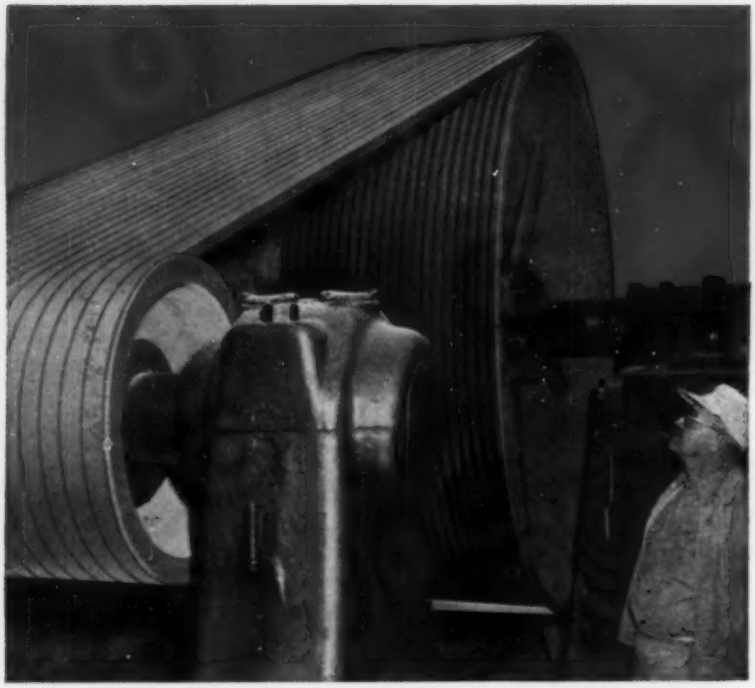
We welcome your inquiries. For descriptive literature on the versatile metal mold process, write to United States Pipe and Foundry Company, Steel and Tubes Division, Burlington, N. J.

Study these advantages for your cylindrically-shaped products

- Reduced processing time and increased production.
- Design of parts to suit the specific job requirements by selecting the correct alloy – not the next best available alternate.
- Conservation of expensive metals and alloys – especially on tubular parts now produced from solid sections.

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter—6" to 50"
Wall Thickness—⅜" and up
Length—Up to 16'
Types of Stainless—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 P H, 17-7 P H and E.L.C. grades.



Why *concave sides* insure longer V-Belt life

With one simple test you can demonstrate to yourself why the concave sides (Fig. 1) of the Gates V-Belt insure far longer belt life.

Just feel the sides of a Gates V-Belt on the bend. Note that in bending around the sheave these sides fill out and become straight (Fig. 1-A). That means the belt makes full contact with the sides of the sheave groove; grips the sheave *evenly*.

This even contact distributes wear uniformly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Now make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating wear at the points shown by arrows. Uneven wear shortens belt life; increases belt costs.

Cut V-belt replacement costs and down time. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope — the V-Belt with concave sides.

The Gates Rubber Company • Denver, Colorado

World's Largest Maker of V-Belts

There are Gates Engineering Offices and Distributor Stocks in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 150

Gates Vulco Rope Drives

(*Concluded from page* 103)

manufacturing operations at its Lebanon, Pa., plant on May 29. Production of residential boilers will be continued at the division's Kewanee, Ill., plant.

Opens Metal Research Center

Metals Research & Development Corp., a laboratory and consulting service for private industry and government agencies, has been established at Exeter, Pa. It will do research on metals, cermets and ceramics, specializing in nuclear reactor core component work.

Crucible in Denver Warehouse

Crucible Steel Co. of America opened a new sales office and specialty steel warehouse at Denver.

GE Transformer Sets Record

The highest-rated power transformer ever ordered from General Electric Corp. is now being built at Pittsfield, Mass. Rated at 375,000 kva, the unit could supply the residential needs of a city of 900,000.

Subsidiary Builds Plant

Carbon Structural Concrete Co. is building a $300,000 plant in Youngstown to make prestressed concrete products. The firm is a recently organized subsidiary of Carbon Limestone Co., Lowellville, O.

Kaiser Supplies Cabinets

Kaiser Metal Products Inc., Bristol, Pa., will supply a complete line of steel kitchen cabinets to Whirlpool-Seeger Corp. They will be marketed under the tradename RCA Whirlpool. Kaiser recently spent $2 million to improve its production facilities.

Forms Quality Control Group

Vanadium-Alloys Steel Co., Latrobe, Pa., established a Metallurgical Quality Control Group which will handle the technical problems of tool steel users. Directed by R. A. Cary, the group is responsible for customer specifications, the application of specifications to or-

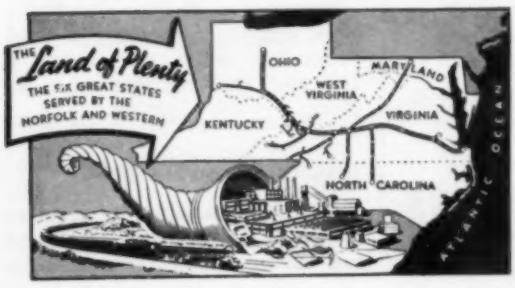
Rule No. 1 for Catching Flies and Making Steel—

BE IN THE RIGHT SPOT!

The Land of Plenty is the right spot, with its virtually inexhaustible source of superior Bituminous Coal, vast deposits of top-grade limestone and plenty of industrial water. Ore can be transported economically from the strategically located Port of Norfolk on famed Hampton Roads.

There's also adequate power and a dependable manpower pool. Add a moderate climate which will never interfere with your operations, and you'll understand why we call this area the Land of Plenty.

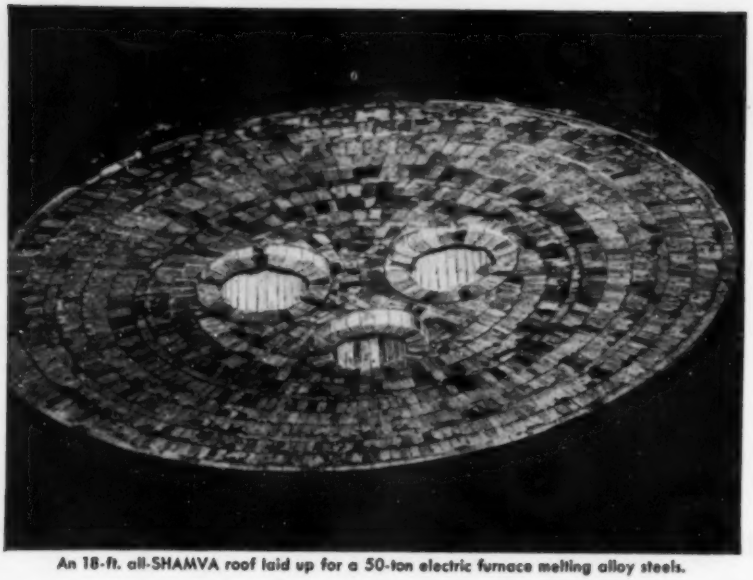
Considering these major production advantages—plus a market using over a million tons of steel a year—the Land of Plenty is an ideal location for the successful operation of a steel mill.



Write, wire or phone—

L. E. Ward, Jr., Manager
Industrial and Agricultural Dept.
Drawer S-759 (Telephone 4-1451, Ext. 474)
Norfolk and Western Railway
Roanoke, Virginia

Norfolk and Western RAILWAY



An 18-ft. all-SHAMVA roof laid up for a 50-ton electric furnace melting alloy steels.

In electric furnace operations

SHAMVA MULLITE GIVES YOU OUTSTANDING SERVICE

"Shamva" Electric Furnace Roof Brick is a coarse and open type refractory, giving you the extreme spalling resistance necessary in top charge electric furnace roofs.

- *High fusion point (3335°F.)*
- *High softening point (over 3000°F.)*
- *Low coefficient of expansion (3.66 x 10^{-6} per °C.)*
- *Anti-spalling (0.7% at 3000°F. Preheat, A.S.T.M. test)*
- *High load bearing strength (—3.1%, at 3000°F., 1½ hrs., 25 p.s.i. A.S.T.M. test)*
- *Low heat conductivity for greater furnace efficiency*

With "Shamva" Mullite Brick, roof life and production increase, down time and labor costs decrease.

Let our field engineers assist in your refractory installation.

WRITE TO: *Mullite Works, Refractories Division, H. K. Porter Company, Inc., Shelton, Conn.*

Distributors in principal cities

HKP MULLITE WORKS REFRACTORIES DIVISION H. K. PORTER COMPANY, INC.

ders, instructions for plant processing, control and inspection.

Forms Subsidiary in Japan

Addressograph-Multigraph Corp., Cleveland, established its eighth subsidiary company, Addressograph-Multigraph of Japan Ltd., with headquarters in Tokyo.

Reynolds Signs Bauxite Accord

Reynolds Metals Co., Richmond, Va., signed a contract with the government of Jamaica establishing bauxite royalties and taxes for 25 years and guaranteeing the right to mine the ore for 99 years. It will pay 3 shillings (42 cents) a long dry ton on the first 2 million tons shipped each year and 2 shillings (28 cents) on the excess. Half the royalty is fixed for 25 years. The other half will vary in direct ratio to the price of aluminum pig in the U.S.

Sells Division to E. H. Wachs

Illinois Tool Works, Chicago, sold its Power Saw Blade Division to E. H. Wachs Co., that city.

Expands Research Facilities

Allegheny Ludlum Steel Corp. will add three buildings to its research center at Brackenridge, Pa., this year. The first will be a laboratory which will house heavy processing equipment—including a 500-ton forging press, a hot sheet and bar rolling mill, a pilot size cold rolling mill, furnaces, a slitting and edge trimming unit and an annealing, pickling and coating line. Also scheduled for completion this year are a light laboratory building and an administrative building.

Machine Firm Diversifies

Monumental Machine Co., Baltimore, organized Monumental Steel Fabricators which will occupy a 7600 sq-ft building adjacent to its plant.

Acquires Hardware Maker

Yale & Towne Mfg. Co. acquired the patents, machinery, inventories and business of the Thomson Hard-

ware Division of Standard-Thomson Corp. Manufacturing operations will be transferred from Vandalia, O., to the Yale Lock & Hardware Division's plant at Salem, Va.

John Wood Has New Facilities

John Wood Co., steel products manufacturer, will build a research laboratory and engineering offices on a 16-acre tract at Florham Park, N. J.

Huck Opens Warehouse

Huck Mfg. Co., Detroit, opened a warehouse at Inglewood, Calif., to distribute blind rivet and lockbolt type fasteners and related tools.

Processes Ethyl Silicate

Polymerized ethyl silicate is being produced at Everett, Mass., by Monsanto Chemical Co.'s Inorganic Chemicals Division. It will be distributed to the investment casting industry by Riches-Nelson Inc. of New York.

Sells Hydraulic Pump Business

A. O. Smith Corp. sold its hydraulic pump business to Fiese & Firstenberger Mfg. Inc., Fresno, Calif., producer of deep well turbine pumps.

Firth Sterling Ltd. in Canada

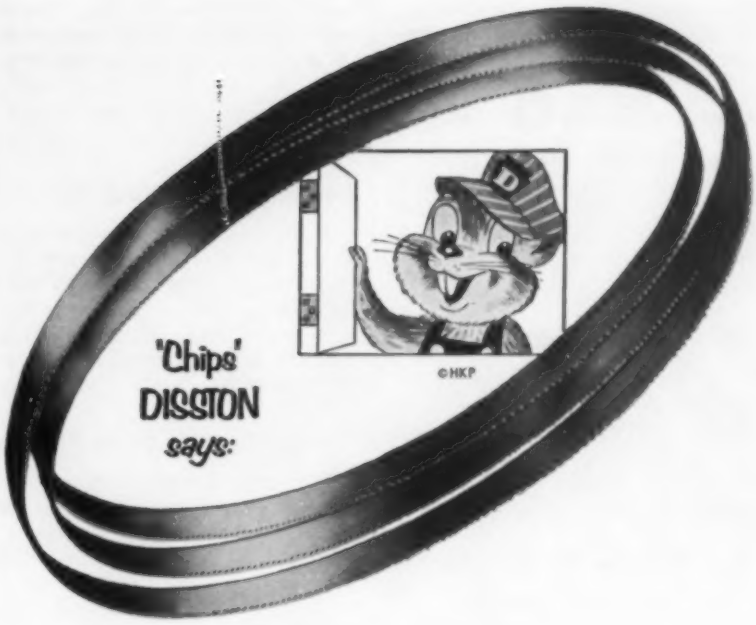
Firth Sterling Ltd., a Canadian corporation, was formed jointly by Firth Sterling Inc., Pittsburgh, and Canadian interests. It will produce tungsten carbide tips at a Brantford, Ont., plant.

Westinghouse Opens Branch

The Industrial Heating Division of Westinghouse Corp. opened a branch at San Francisco. It will design, manufacture and sell electric and gas-fired heating systems. R. R. LaPelle is manager.

New Wire Unit for Bethlehem

Bethlehem Steel Co. established a Fine & Specialty Wire Department at its Johnstown, Pa., plant. It will produce fine wire as small as 0.007 in. (40 gage) and shaped



"for long, long blade life—
choose a DISSTON!"

Does your work call for close tolerance cutting . . . fine edge-holding qualities . . . good finish? Disston Metal Cutting Band Saws give you all that and more —*long, long blade life!*

LANCER TOOTH—Hard edge blade with positive rake angle tooth. Permits high-speed production cutting of non-ferrous metal, wood and plastic. Cuts brass and aluminum solids and Plexiglas with equal ease.

REGULAR TOOTH—Hard edge flexible back band saw with finer tooth spacing. Cuts all ferrous metals and thinner sections of non-ferrous metal and plastic. Excellent for sawing angle iron, steel tubing, nickel plate and brass sheets.

Your Disston distributor is the man to see if production is too low and costs too high. He can help you boost one and lower the other.

NEW BOOKLET—YOURS FREE!

To obtain YOUR FREE COPY of Disston's colorful, information-packed booklet on Metal Cutting Band Saws, write today to Dept. 26, Henry Disston Division, H. K. Porter Company, Inc., Philadelphia 35, Pa.

HKP Henry DISSTON DIVISION
H. K. PORTER COMPANY, INC.

wire from 1/16-in. minimum to ¾-in. maximum (square or equivalent).

Lima Electric Motor Co. Sold

Consolidated Diesel Electric Corp., Stamford, Conn., purchased the business and assets of Lima Electric Motor Co., Lima, O. It will operate the business as a subsidiary.

Wisconsin Firm Builds Foundry

Sparta Mfg. Co. Inc., newly organized producer of engine cylinder sleeves, will build a $150,000 plant at Sparta, Wis. The 22,000 sq-ft facility will house a foundry and a machine shop.

New Plant for Air Reduction

Air Reduction Sales Co. will build a $9-million plant for the production of liquid oxygen, nitrogen and argon at Acton, Mass.

New Scrapyard at Shreveport

Commercial Metals Co., Dallas, opened a scrapyard at 3919 Mansfield Rd., Shreveport, La. It will buy mixed carloads and truckloads of nonferrous metals, scrap iron, pipe, oil field salvage and structural steel. W. A. Bushman is manager.

Doubles Research Facilities

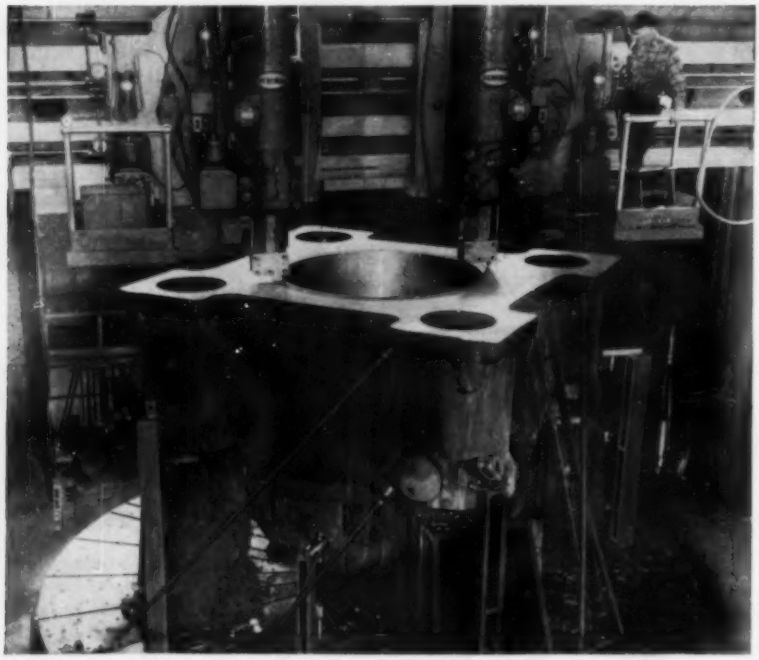
Associated Spring Corp., Bristol, Conn., will double its research facilities by establishing a new center for mechanical and metallurgical engineering. H. Perry Smith, formerly of Underwood Corp., will be in charge.

Chicago Rawhide Opens Plant

Chicago Rawhide Mfg. Co. opened a new polymer plant at Elgin, Ill. Products to be manufactured include oil seals, diaphragms, packings and other molded parts for autos, jet aircraft, rockets and guided missiles.

Oilgear Forms Technical Unit

Oilgear Co., Milwaukee, formed a technical division at 679 Main St., Waltham, Mass. Called Servocontrol, it will develop and produce



One of the Biggest Castings Ever Made in Canada

After machining at the Lachine Works of Canadian Allis-Chalmers Ltd., this casting will be used in construction of a 16,000-ton, three-unit hydraulic 0-ing press. Designed by Verson Allsteel Press Co., Chicago, the press will form welded pipe in 20 to 36 in. diameters for Welland Tubes Ltd., Welland, Ont.

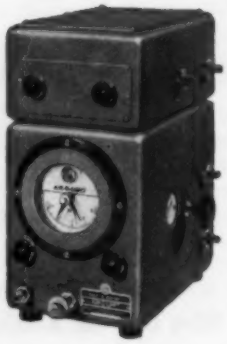
(Advertisement)

BUILD A GAGE INSTALLATION TO SUIT YOUR NEEDS . . .

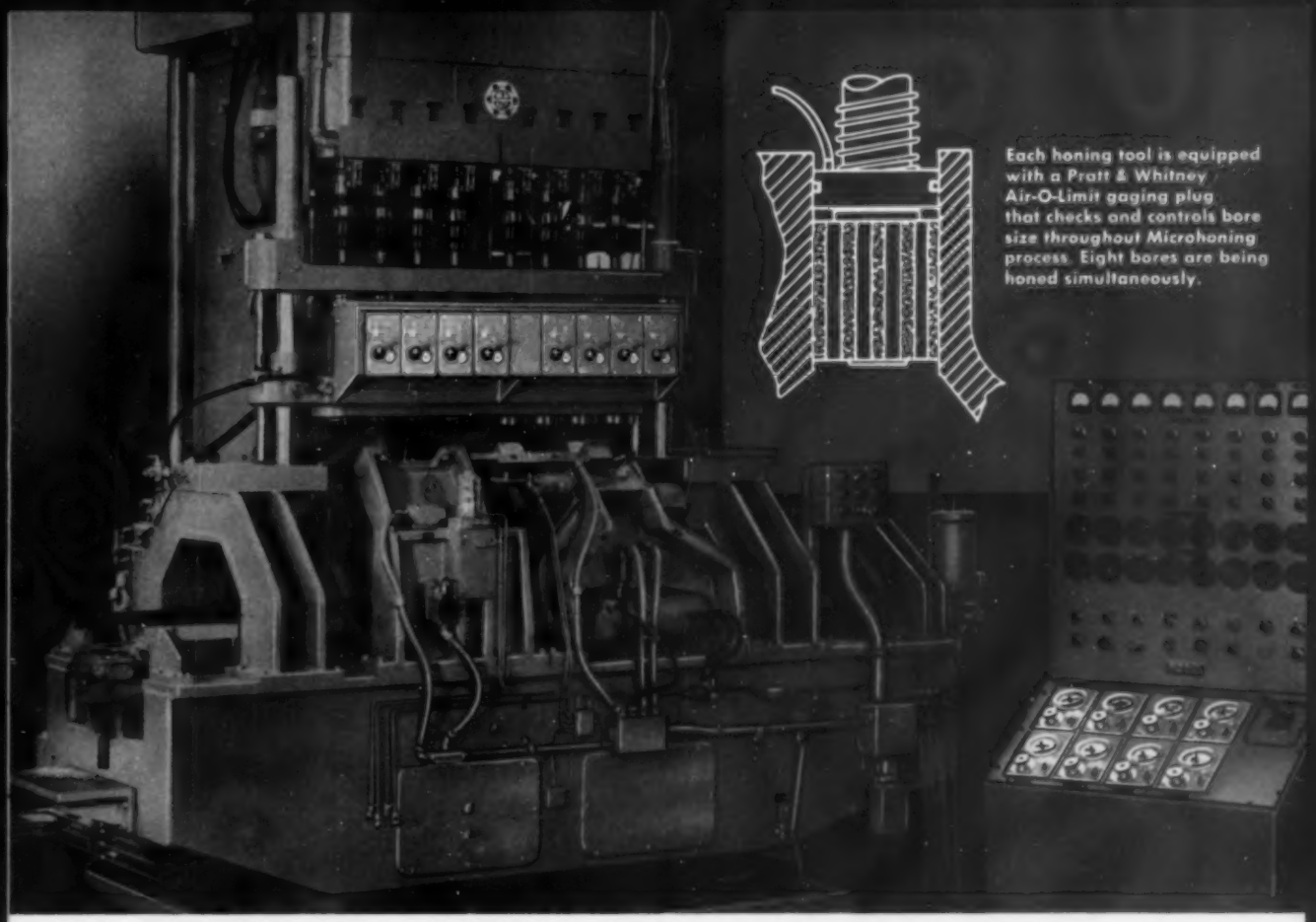
with these packaged, on-the-shelf P&W Air-O-Limit Light Signal Units. Can be used to signal operator or to provide feed-back impulse for fully automatic process control.

BASIC 2-LIMIT UNIT . . . indicates high and low tolerances. Suitable for sorting and other "yes-or-no" control applications.

3-LIMIT UNIT . . . especially suited for grinding and similar operations. Indicates or automatically controls such conditions as: "Fast Feed," "Slow Feed," and "Spark-Out."



4-LIMIT UNIT . . . similar to 3-Limit Unit, but provides greater control scope. Indicates or controls such conditions as: "Approach High Limit," "High Limit," "Approach Low Limit" and "Low Limit."



Each honing tool is equipped with a Pratt & Whitney Air-O-Limit gaging plug that checks and controls bore size throughout Microhoning process. Eight bores are being honed simultaneously.

PHOTO COURTESY OF MICROMATIC HONE CORPORATION, DETROIT, MICH.

Make Your Investment in Precision Pay Off in PRODUCTION

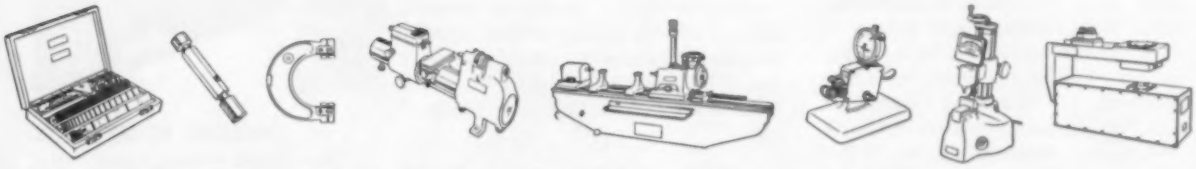
• • • WITH PRATT & WHITNEY "PACKAGED" AUTOMATION GAGE UNITS

Applied to your precision production machines, "P&W Automation Gaging" will make it possible for you to increase production, reduce scrap losses and put to work more effectively the high precision built into your equipment. And in addition, the use of Pratt & Whitney standard, on-the-shelf Packaged Gage Units will provide an installation *custom-tailored* to your exact needs *WITHOUT* the expense and delays involved in engineering and constructing special controls.

In this example – a Micromatic Hydrohoner – automotive cylinder blocks are gaged *during* the Microhoning process. When final size is reached, the machine is automatically shut off and the Microhoning tools are retracted. A change to a different bore size can be made, without stopping the machine, by a simple adjustment on a calibrated gage control dial. Visual indication is given of the accuracy of the new adjustment. Cylinder blocks are produced at a rate of 120 per hour. Reject and scrap losses are virtually eliminated.

Make the most of *your* investment . . . make it a point to call in a P&W Field Engineer to analyze your production requirements and recommend the right P&W Automation Gaging installation to help you increase output, improve accuracy and reduce reject losses.

Pratt & Whitney Company, Incorporated,
13 Charter Oak Boulevard, West Hartford, Connecticut.



GAGE BLOCKS . . . CONVENTIONAL GAGES . . . SUPERMICROMETERS . . . STANDARD MEASURING MACHINES . . . COMPARATORS . . . AUTOMATION AND CONTINUOUS GAGES

PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

electro-hydraulic components and engineer complete servosystems.

Fisher Scientific Co. Expands

Fisher Scientific Co., manufacturer of laboratory instruments, apparatus and reagent chemicals, purchased the laboratory apparatus and supply business of E. Machlett & Son, New York.

Polymer Corp. Opens Plant

Polymer Corp., Reading, Pa., opened a plant at 3030 Oak St., Santa Ana, Calif., for custom coating, using the Whirlclad process.

ASSOCIATIONS

American Production & Inventory Control Society, Cleveland, elected these officers pro tem: President, M. W. Maddox, Mueller Brass Co., Port Huron, Mich.; vice president, R. E. Carruth, Acushnet Process Co., New Bedford, Mass.; secretary, Don Burkhart, Haynes Stellite Corp., Kokomo, Ind.; treasurer, Louis Norheimer, Tube-Turns Inc., Louisville.

Fuel Oil & Water Heater Manufacturers' Association, New York, elected these officers: President, C. E. Drake, Patterson-Kelley Inc., East Stroudsburg, Pa.; vice president, Walter Veit, Manning & Lewis Engineering Co., Newark, N.J.; secretary, W. B. Gorey, Adsco Industries Inc., North Tonawanda, N.Y.

National Fluid Power Association, Evanston, Ill., elected these officers: President, R. J. Murphy, New York Air Brake Co., Kalamazoo, Mich.; first vice president, J. A. Marsh, Rivett Lathe & Grinder Inc., Boston; second vice president, L. L. Charlson, Char-Lynn Co., Minneapolis; treasurer, E. G. Peterson, Hannifin Corp., Des Plaines, Ill.

American Institute of Mining, Metallurgical & Petroleum Engineers Inc., New York, established these divisions: Society of Mining Engineers of AIME — President, E. A. Jones, St. Joseph Lead Co., Bonne Terre, Mo.; Metallurgical Society of AIME—President, J. C. Kinnear Jr., Kennecott Copper Corp., McGill, Nev.; Society of Petroleum Engineers of AIME—President, J. P. Hammond, Amerada Petroleum Co., Tulsa, Okla. National President of AIME is G. J. Holt, Cleveland-Cliffs Iron Co., Ishpeming, Mich.

REPRESENTATIVES

Hartford Special Machinery Co., Hartford, Conn., appointed these representatives: Walter F. Cahill Co., Detroit; Krause Machinery Co., Merrick, N.Y.; Charles B. Kopecky Co., Syracuse, N.Y.; Henderson Tool Co., Peoria, Ill.; George Garwood, Philadelphia; Apex Machine Tool Supply Inc., Charlotte, N.C.; Pelham Machinery Co., Dumont, N.Y.; Armin H. Wille & Associates, Pittsburgh; and Machinery Engineering & Sales Co., Providence, R.I.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., authorized Noland Co. Inc., Chattanooga, Tenn., to sell its hydraulic presses in Georgia and Tennessee.

Clark Equipment Co., Battle Creek, Mich., appointed J. A. Kraatz Corp., Pawtucket, R.I., to sell and service its fork lift trucks, straddle carriers and powered hand trucks in Rhode Island and southeast Massachusetts.

Baldwin - Lima - Hamilton Corp., Philadelphia, named A. V. Wiggins Co. Inc. as its Syracuse, N.Y., dealer for presses made by the Hamilton Division.

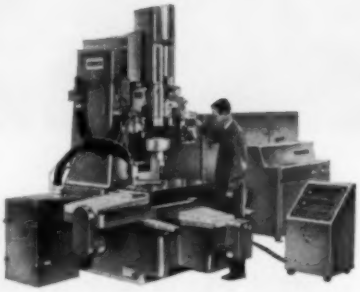
Chrysler Corp. appointed these dealers for its Marine & Industrial Engine Division: Engines & Parts Inc., Saddle Brook, N.J., and Cardinal Carryor Co. Inc., Louisville.

Radio Corp. of America appointed these distributors for its industrial closed-circuit television equipment and systems: Eastern Theatre Supply Co. Inc., Buffalo; Ernie Forbes Theatre Supply, Detroit; Lake Service Corp., Boston; and J. A. Walsh & Co., Houston.

PRATT & WHITNEY
NUMERICAL CONTROL
APPLICATIONS

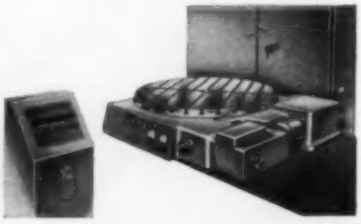
ELECTROLIMIT JIG BORER

Equipped with Numerical Control, the P&W No. 2E Jig Borer is equally suitable for toolroom and precision production applications. Settings accurate to .0001" are made automatically from data supplied by a punched tape or an operator's keyboard.



VERTICAL PRECISION HOLE GRINDER

Table and carriage are similar in design to the No. 2E Jig Borer and the same ultra-precision Electrolimit Measuring System is employed. Column, however, is equipped with interchangeable, turbine-driven grinding heads for spindle speeds to 100,000 rpm.



PRECISION ROTARY TABLES

These Pratt & Whitney Rotary Tables are the ultimate in precision and convenience for circular spacing, graduating and angular positioning. Settings accurate to 5 seconds of arc (2 seconds for repetitive settings) are made automatically from data supplied by punched tape or operator's keyboard.

PRATT & WHITNEY

TO "TENTHS" IN SECONDS

. . . *and no mistakes!*

WITH NEW PRATT & WHITNEY NUMERICAL CONTROL

Operating under Numerical Control, this P&W Precision Hole Grinder is positioned and re-positioned — accurate to .0001" — in an average of only 14 seconds! And since settings are controlled by a punched tape, the chance of work spoilage through operator error in reading blueprint data or setting dials is eliminated. The operator is free to concentrate his attention on work quality.

Applied to Pratt & Whitney Jig Borers, Precision Hole Grinders, Rotary Tables and special machines, Numerical Control not only speeds up toolroom operations, but also makes the high precision of these machines available for efficient short- or long-run production work. In this type work, time savings up to 40% over manual operation are realized. Compare the performance of your present manually-controlled machines with the new standards of speed, accuracy and economy being established by numerically-controlled P&W equipment. If they don't measure up, you are missing important opportunities for improved work quality, larger savings and greater profits.

Write now for complete information.
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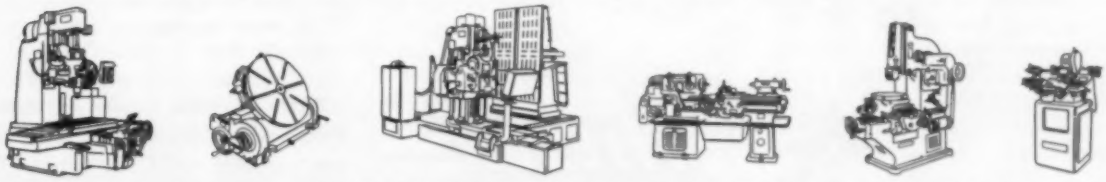

JIG BORERS . . . ROTARY TABLES . . . KELLER MACHINES . . . LATHES . . . VERTICAL SHAPERS . . . CUTTER AND RADIUS GRINDERS

PRATT & WHITNEY

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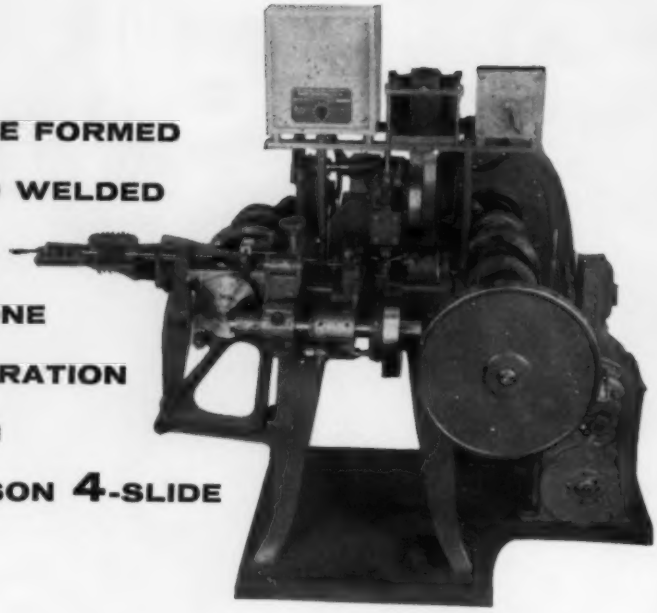
MACHINE TOOLS • GAGES • CUTTING TOOLS

WIRE FORMED AND WELDED IN ONE OPERATION WITH NILSON 4-SLIDE



Garter loop formed and welded in one fast operation by Nilson 4-Slide.

Production is increased more than 25% by Hawie Manufacturing Company using a #1 Nilson 4-Slide with welding attachment which eliminates need for ferrule loops in the manufacture of hose supporters. .062 soft basic wire is formed with ends welded in one automatic operation at a conservative 105 pieces per minute. Additional savings are realized in eliminating cost of ferrule.

Another example — Drapery hook is formed with two wires entering 4-Slide simultaneously and automatically welded together at point of contact.

Nilson 4-Slides will produce many types of wire forms similar to the part shown here in which two pieces must be welded or otherwise closed together. By the mounting of automatic welding equipment on the 4-Slide, such parts can be produced in one fast, accurate operation at minimum cost. Nilson 4-Slide Wire Forming Machines are available in a wide range of sizes to handle basic steel wire from 1/32" to 1/2" diameter.

A.H. NILSON MACHINE COMPANY

1512 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

Get Set for Metalworking's Fabulous Future . . .

inventory management

road to lower costs

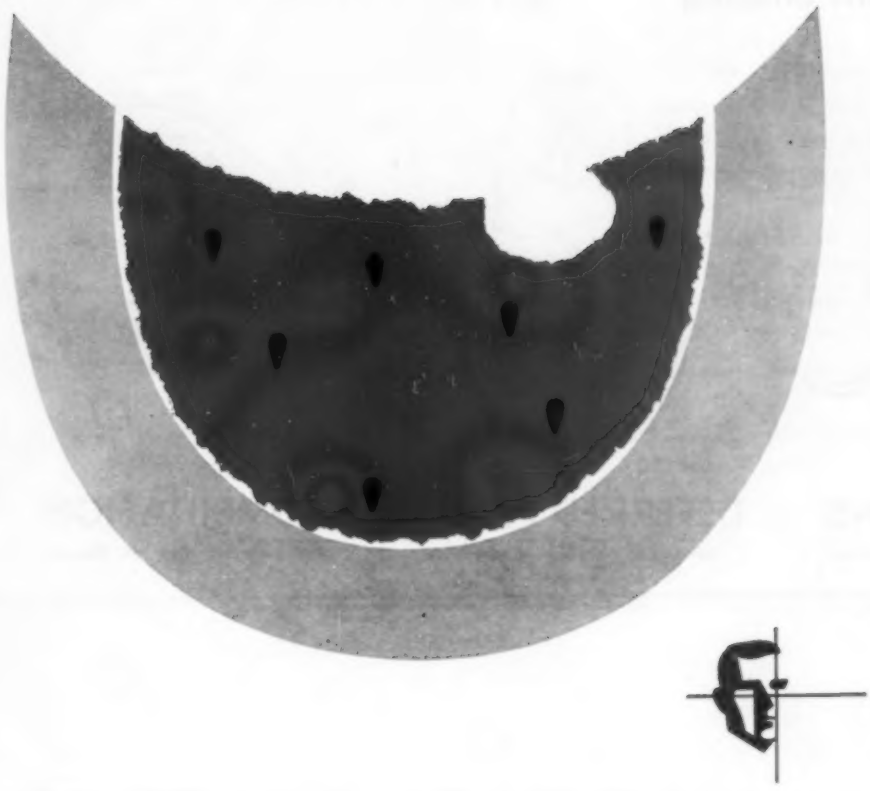
● The company that poorly manages its inventory of materials or finished goods is in as much trouble as the one that poorly manages its sales or production efforts. STEEL, in its May 13 issue, will show how inventory management can lower costs, lower stocks and help stabilize production.

The key: Integrate inventory management into the entire company operation.

Check to see how that can be done in the fourth installment of STEEL's 1957 Program for Management, appearing next month. Articles in the ten-part series published to date:

1. **The Care and Feeding of the Junior Executive**
   (Feb. 11, p. 93)
2. **Grooming Middle Managers**
   (Mar. 18, p. 93)
3. **Profit Sharing**
   (Apr. 15, p. 115)

Extra personal copies of these Program for Management articles are available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



Profit Sharing

Spur for Productivity

ARE you willing to trade a slice of your melon for the employment of the whole man?

It could be the idea you've been looking for if your competition is getting tougher and your earnings sag despite increasing sales.

"Since installing profit sharing in 1952," reports Pneumafil Corp., Charlotte, N. C., "we have more than tripled in size and tripled our rate of productivity."

Adds Pivot Punch & Die Corp., North Tonawanda, N. Y.: "We paid $99,859 in profit sharing to our employees last year. Even our profits before taxes were 100 per cent higher than 1955's."

C. A. Norgren Co., Englewood, Colo., says: "Our productivity has jumped 305 per cent in 15 years. We have had to boost prices of our products only 25 per cent in the period, although wages climbed 228 per cent and raw materials went up 155 per cent."

Fabulous Future — The experiences of those companies are evidence that profit sharing has something to offer metalworking management: It is an incentive tool that can be used to fight ascending costs through improved productivity—a daily battle that promises to get rougher over the next 20 years.

Of course, like all management tools, it may be one company's meat, another's poison. It seems to work particularly well in small and medium-sized firms. Some of the big companies, including General Electric Co., and Westinghouse Electric Corp., have dropped their plans for one reason or another.

One thing is certain. Profit sharing is getting a big play today because of the business climate.

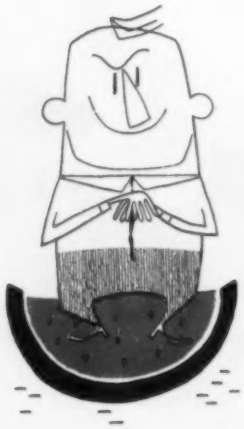
Spotting the Trend

Says J. J. Jehring, director of Profit Sharing Research Founda-

Ways to Profit Sharing

CASH PLANS

Payments annually or oftener



DEFERRED PLANS

Payments on retirement or separation

COMBINATION

Part payments often, rest deferred

tion, Evanston, Ill.: "Ten new deferred profit sharing plans are being started every working day by American business."

Plans are in operation in metalworking plants in almost every state and in every phase of the industry except auto manufacturing.

Definition — More than 20,000 plans of one kind or another are used in the U.S., but Joseph B. Meier, executive secretary of the Council of Profit Sharing Industries, Chicago, prefers to limit profit sharing to the 1500 or 2000 which cover all or nearly all the employees of a company. (The others usually include only management personnel.)

Plans meeting Mr. Meier's definition cover about 800,000 people. Some are cash plans, some deferred, some combinations of the two. Since they seem to have the most to offer, this article is confined to them.

How It Helps

"The case for profit sharing," says Thomas C. Kent, director of personnel, Daisy Mfg. Co., Plymouth, Mich., "can best be described as one of co-operation rather than inspiration . . . " Another observer offers these specifics:

"Profit sharing definitely puts us in a better position than our competitors because our employees are aware that production cost cutting is most often the answer to meeting competition, particularly when business is slack. There is no question that each employee feels more like a stockholder and is concerned to do things by the most efficient method," concludes W. H. Shank, chairman, profit sharing advisory committee, Hardinge Co. Inc., York, Pa.

Human Relations—The emphasis is on people. Says C. Neil Norgren, executive vice president of the Norgren company: "The greatest strength of our profit sharing program is the full realization by all our employees that the most important aspect of our business is our customer."

Basically, it gives management a tool to use in its human relations program. The best laid plans of personnel departments are often temporary, requiring new fuel periodically, but profit sharing seems to let the employees fuel their own fires of enthusiasm for their jobs and companies.

Signode Steel Strapping Co., Chicago, cites four reasons for success: 1. Employees have a direct interest in saving company property and doing their jobs well. 2. Improved equipment and better manufacturing methods are readily accepted by employees. 3. Good workers are less likely to leave the company. 4. New high grade employees are attracted to it.

Perspective—The potential overall benefits of profit sharing are interesting to contemplate.

Through regular briefings on the company's progress, the worker gains valuable insight into the workings of our economy. Individual productive efforts multiplied a million times could conceivably change a depression into a recession; indirectly, better employee attitudes could work toward creating more consumer confidence in the future.

How Profit Sharing Pays Off

1. Increased production.
2. Less waste.
3. Less scrap.
4. Less turnover.
5. Decreased absenteeism.
6. Better employee morale.
7. More employee suggestions.
8. Better community relations.
9. Increased employee buying power.
10. Closer identification of employees with stockholders.
11. Less need for close supervision.
12. Better labor-management relations.
13. Possibility of less fixed costs for fringe benefits.
14. Built-in answer to employees' fear of inflation.
15. Self-reliance among employees.
16. Employee acceptance of new production techniques.
17. Anticipation of future union demands for shorter work week, educational and housing benefits.
18. Closer ties with union local; decreased influence of the international on employees.
19. Team spirit: Slackers are kept in line by fellow employees.
20. Improved understanding of business by other elements of society.

The Economy—Mr. Jehring cites these benefits to the whole economy: 1. Increased production. 2. Increased purchasing power. 3. Increased capital through deferred trust investments. 4. Less fixed commitments for the company. 5. Protection of the rights of private property. 6. Decreased governmental interference in business.

He offers this thought: The economic theory of Communism appeals to the world's workers. Capitalism can meet the challenge with profit sharing.

No one can expect those benefits to come easily. Advises J. P. Gill, president, Vanadium-Alloys Steel Co., Latrobe, Pa.: "We can see no reason why a plan cannot be adopted by the entire steel industry, but we do feel it must be in operation for several years before its full benefits can be realized."

Side Effects—Signode credits its profit sharing plan with keeping it well supplied with skilled workers. It has only one skilled job open in its Chicago plant, where the labor market is exceedingly tight. The firm recently moved 135 employees from one plant to another in Chicago, not losing one, even though they had to commute farther and arrange their own car pools because public transportation was lacking.

Another midwestern firm describes this case history: Employees asked for air conditioning in their plant but settled for improved ventilation when they learned the air conditioning system would wipe out most of the company's profits for the year.

Plans

Like Arwood Precision Casting Corp., New York, you could pay your employees 50 per cent of net profits before taxes. (Stockholders get the first share up to 5.5 per cent on their investment.)

Cash—The company makes quarterly cash payments of one-half the amount due each employee. It pays the other half at the end of the year. Payments are based on individual wages or salaries, as weighted by multiplying factors ranging from 1 to 4, depending on degree of responsibility.

In 1956, payments averaged about 19 per cent of each employee's annual wage.

Deferred—Graver Tank & Mfg. Co. Inc., East Chicago, Ind., has a deferred plan, with an employee contributory feature. Ten per cent of its profits before taxes or dividends goes into a trust fund. The employee contributes 3 per cent of his wages. The company's contribution is added to each employee's account in terms of service and the amount of money he contributes. Payments are made from the fund upon retirement, death, total disability, termination of employment after 20 years' service and for emergency loans. Funds are invested in government bonds and company stocks.

Deferred plans operate as substitutes for pension plans and are popular for that reason. But you can have both. Pitney-Bowes Inc., Stamford, Conn., sets aside 25 per cent of its operating profits every quarter for profit sharing. Before distribution, necessary payments

are made into its retirement fund. The balance goes to employees in cash on a service and salary formula.

Combination—Commercial Steel Treating Corp., Detroit, combines the cash and deferred methods. Half the profits over 10 per cent of sales are paid in cash every month. Before taxes, Commercial makes these deposits into the employees' trust fund: 1. Five cents per straight-time hour worked by employees with less than three years' service. 2. Twenty per cent of the remaining profits.

Bell & Howell Co., Chicago, also has a combination plan, with this added feature: One per cent of the employee's annual pay is credited to his trust fund account if he elects to deposit at least 2 per cent of his pay into the fund. This is the contributory formula like Graver Tank's, but it is not compulsory.

Spectacular—Sears, Roebuck & Co. has the most sensational plan. File clerks reportedly have retired with upward of $100,000 in their trust accounts. Sears invests heavily in its own stock, the chief reason for the success of its plan.

Signode has followed the same formula (page 120). Employees must pay from 2 to 4 per cent of their wages into the fund—up to $300 a year. The company pays 20 per cent of its net income after taxes and after deductions for preferred stockholders and 25 cents per share for common stockholders. The trust fund holds about 10 per cent of the company's common stock. (One-third of the money is so invested.) So the fund benefits directly from profit sharing and the increasing value of the stock.

Variations—Those are a few of the roads to profit sharing. You can offer your employees immediate incentives through cash payments and/or long range benefits through trust funds. You can invest it a great many ways.

To qualify as tax-free trusts, all

Is Profit Sharing Really Successful?

Some measurements you can use in your own plant

INTANGIBLES

1. Team spirit

"When you see a piece-rate man take time to help an hourly wage earner, you know profit sharing is working."

Anthony J. Yonto, president, Quality Castings Co., Orrville, O.

2. Employee responsibility

"I came across this fellow separating salvageable parts from discards. He told me the salvage meant more money for the profit sharing fund."

Walter H. Seidel, director of personnel, Signode Steel Strapping Co., Chicago.

3. Union attitudes

"The union told us to set the work standards, but warned us not to fumble the ball. Not a single grievance has been filed concerning workloads in four years, although 200 new or changed standards have been set."

Thomas C. Kent, director of personnel, Daisy Mfg. Co., Plymouth, Mich.

YARDSTICKS TO USE

1. Employee suggestions

"Our employee suggestion system is part of our profit sharing plan."

W. H. Shank, chairman, profit sharing advisory committee, Hardinge Co., York, Pa.

2. Turnover

"It is impossible to isolate completely the relationship between turnover and profit sharing, but this relationship is more than casual in our plant. In 1951, the first year of our plan, turnover was 30.4 per cent. In 1956, it had dropped to 0.7 per cent."

Robert C. Hickle, personnel director, Schield Bantam Co., Waverly, Iowa

3. Absenteeism

"We have little or no absenteeism without just cause."

J. P. Gill, president, Vanadium-Alloys Steel Co., Latrobe, Pa.

4. Production

"Of 18 firms checked in 1955, not one was able to specifically measure production increases, but all believed there was some increase growing out of profit sharing."

J. J. Jehring, director, Profit Sharing Research Foundation, Evanston, Ill.

funds are subject to the rulings of the Internal Revenue Service.

Unique—Mention should be made of Lincoln Electric Co.'s plan—although it is not regarded by Lincoln or many members of the council as a true profit sharing plan. Gross profits are applied to paying 6 per cent on invested capital and to needs for capital expenditures. The remainder goes to workers.

John W. Leslie, Signode's chairman, comments on the Lincoln plan: "It is questionable whether the management of a publicly owned company has the right to put into a profit sharing plan more money than it guesses would be compensated for by improved morale and contributions to the company's profits by the employees."

There is a limit to the return you can expect.

Another problem: Your profits must be enough to be meaningful when divided with your workers. GE dropped its program because some employees received as little as $17 in the last year it operated.

Motivation—Records of earnings and planned expenditures for expansion must guide you when you are looking to see if your profits are enough to motivate men. Many authorities think 10 per cent of the annual wage is sufficient. They also believe that the company or company unit sharing in profits must be small so participants can see how their efforts are helping to boost earnings.

Where It Works

Will profit sharing work in any metalworking industry?

Anthony J. Yonto, president, Quality Castings Co., Orrville, O., suggests: "If you can make it work in a foundry, you can make it work anywhere."

Some firms feel they are giving something away when they share profits, but Mr. Yonto contends: "We are sharing profits we would have never had without profit

Who's Who in Profit Sharing

Note the diversity of metalworking firms in this sample

Arwood Precision Casting Corp.,
New York ..... short run jobbing foundry

Bell & Howell Co.,
Chicago ..... camera manufacturer

Commercial Steel Treating Corp.,
Detroit ..... heat treater

Daisy Mfg. Co.,
Plymouth, Mich. ..... air rifle manufacturer

Dings Magnetic Separator Co.,
Milwaukee ..... magnet maker

Hardinge Co. Inc.,
York, Pa. ..... machinery builder

Kwikset Locks Inc.,
Anaheim, Calif. ..... lockmaker

Lincoln Electric Co.,
Cleveland ..... welding machinery maker

Motorola Inc.,
Chicago ..... electronics equipment maker

C. A. Norgren Co.,
Englewood, Colo. ... pneumatic products manufacturer

Oregon Saw Chain Corp.,
Portland, Oreg. ..... saw chain maker

Pitney-Bowes Inc.,
Stamford, Conn. ..... mailing machine maker

Pivot Punch & Die Corp.,
North Tonawanda, N. Y. ..... die processor

Quality Castings Co.,
Orrville, O. ..... iron and magnesium foundry

Signode Steel Strapping Co.,
Chicago ..... steel strapping maker

Vanadium-Alloys Steel Co.,
Latrobe, Pa. ..... steelmaker

sharing." Quality's first quarterly cash payment to 100 employees ten years ago was around $7500. Its latest was $80,000 for 250 employees.

Electronics — Small and large firms in the electronics industry have had a great deal of success with profit sharing. Motorola Inc., Chicago, is an outstanding example.

The council's Mr. Meier explains the situation this way: 1. It's a young industry with young, progressive management. 2. It needs new products (employees' suggestions are well received). 3. It's a tremendous growth industry with spiraling sales.

Sidelight: Mr. Jehring believes profit sharing companies tend to cluster by industry. If one firm makes it work, it enjoys a competitive edge. Others must follow to close the gap.

Multiplant — Arwood Precision Casting is a multiplant operation. Its four plants participate in the same plan and vie to make the biggest contribution to increased profits. Last October, the company's house organ printed this information on rejects:

Groton, Conn.	20 per cent
Brooklyn, N. Y.	8 per cent
Tilton, N. H.	10 per cent
Los Angeles	20 per cent

It's safe to say that this fact hit home: If rejects are cut in half, wrote Harold M. Goldsmith, controller, it would have the same effect as increasing sales by $766,000.

Why Failures?

Profit sharing doesn't work everywhere, but it's difficult to pin down the reasons.

Boom and Bust — Says an Indiana firm: "We are convinced that profit sharing is good and an ideal to be achieved, but our plant and our people were not properly educated for it." The firm supplies the auto industry and has had some unusual ups and downs lately. Failure to communicate the reasons behind dwindling profits led to the dropping of the plan.

Young companies have to be especially careful. Rapid expansion may have put their cash in a precarious position. Profit sharing could make it worse. Mr. Leslie of Signode thinks such companies might try putting their own stock into their trust fund if they have a deferred plan.

Reasons — The council says only 5 per cent of all plans fail. It cites four common reasons: 1. No profits. 2. Changes in ownership. 3. Failure as a group incentive. 4. Preference for wage increases.

Some unions have battled profit sharing by demanding wage increases. But if pay is the issue, plans generally fail because the company paid substandard wages to begin with and counted on profit sharing to hold its workers in line.

Turn About—When profit sharing has been put in without the help of unions, it takes only a couple of years for the unions to claim they thought of the idea in the first place. Mr. Jehring sees it this way: "Profit sharing is the logical goal of any labor union. Note United Steelworker President David McDonald's recent statements about sharing steel profits. Profit sharing helps stop the unions' destructive attitude; makes it constructive."

Failure as a group incentive goes to the heart of profit sharing. Your communications program is vital here. Offers a Wisconsin foundry: "Our plan has been in operation only three years, and while we have had profits every year, they have not been especially outstanding. At least half that time we did nothing to keep our people informed as to how the plan worked."

Communications—Advises W. L. Johnson, vice president, Bell & Howell: "We constantly sell our plan through information committees made up of the thought leaders in each working section."

Edward H. Huntzinger, vice president - manufacturing, Pivot Punch & Die Corp., says his company posts graphs on work area bulletin boards each month to show how its cash plan is progressing.

Says Graver Tank's treasurer, Roger F. Dunn: "Publishing full information on profits helps employee relations; it doesn't hurt you with your competition either. We invite our competition to see our plants." This year, Graver is conducting a series of meetings at each of its plants. A sales vice president will outline prospects for the year ahead.

Trust Fund Growth

Net assets at end of year

(thousands)

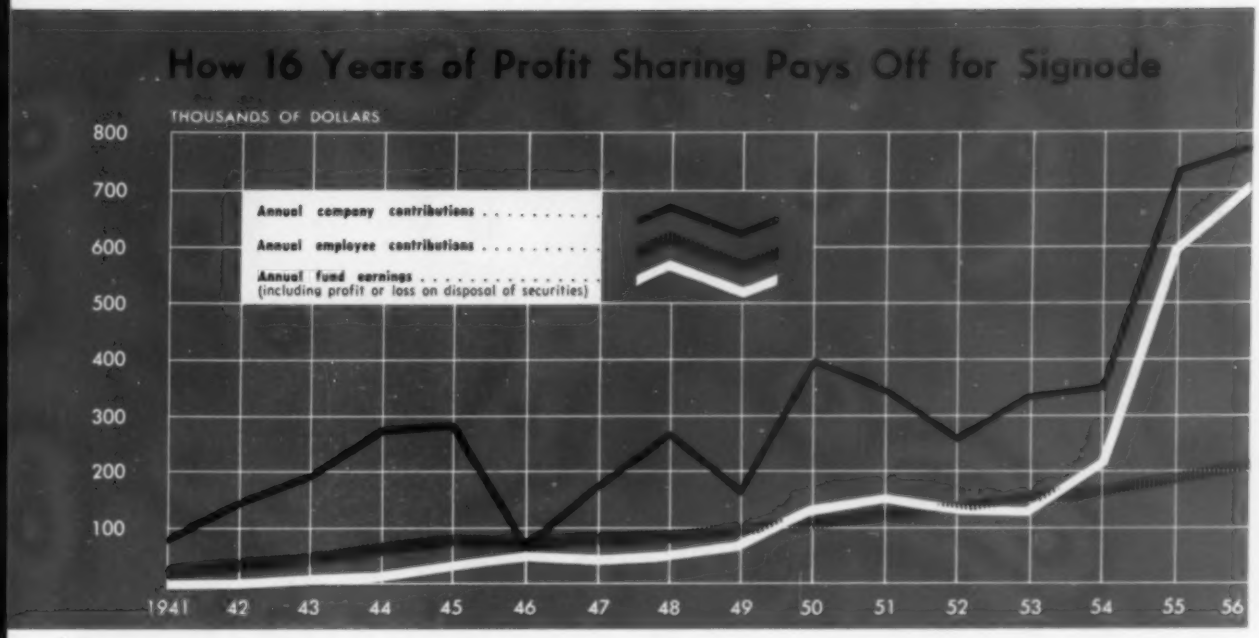
1956	$6530
1954	3923
1952	3030
1950	2328
1948	1677
1946	1238
1944	860
1942	290

Fringe Benefits, Too

Don't make the mistake of expecting profit sharing to be a catchall for fringe benefits. All companies cited so far have plenty of fringes—such as pensions (in or out of profit sharing plans), insurance, hospitalization and paid vacations.

Fixed Costs—Here's what Signode's fringes cost in 1955 as a percentage of gross payroll above direct pay:

Social security, unemployment compensation, and workmen's compensation	2.4 per cent
Life insurance, sickness and accident insurance and hospitalization	1.2 per cent
Paid rest periods, lunch periods and get-ready time	3.3 per cent
Vacations, holidays and sick leave	6.5 per cent
Christmas bonuses and suggestion awards	0.7 per cent
Loss on cafeteria operation	0.6 per cent



Note: 1941 is for nine months.
Source: Signode Steel Strapping Co., Chicago (Signode Employees' Savings & Profit Sharing Trust Fund).

Contribution to employee activities	0.3 per cent
Total	15.0 per cent

Signode's profit sharing contributions amounted to 12.9 per cent of the gross payroll.

SUB — One place where profit sharing can operate as a fringe substitute: Leeds & Northrup Co., Philadelphia, and Commercial Steel Treating have Supplemental Unemployment Benefit provisions in their plans (STEEL, Jan. 14, p. 43). Under carefully defined circumstances, profit sharing funds can be diverted for layoff payments.

Mr. Dunn of Graver Tank comments: "We would hesitate to raid our fund during an unemployment period, although we wouldn't like to see ourselves saddled with the fixed payment involved with SUB."

Profit sharing may have plenty of appeal to the highly skilled senior worker in the automotive industry who has felt that SUB never was designed for him. That may be one reason for this contention: "The unions will seek profit sharing faster than management will want to give it," says Lucas S. Miel, president, Commercial Steel.

Dings Magnetic Separator Co., Milwaukee, beat its union to the punch, says O. H. Adams, executive vice president. "Rather than have the demand for retirement plans and SUB come from the union, we elected to anticipate them with profit sharing."

Pensions—To change over from a pension plan to profit sharing offers some advantages. Notes Mr. Jehring: "If you can gain additional incentive value from a deferred profit sharing plan, and you have had little incentive value from a pension plan, the workers are basically paying for their own pension plan."

In addition, you've eliminated the fixed cost aspect of pension plans —they probably would go under faster than profit sharing plans in a major depression.

Pitney-Bowes dislikes this point of view. To Walter H. Wheeler Jr., president, profit sharing comes after a solid pension plan. He believes the company should bear the fixed cost of the pension plan.

Another angle: The founder of Quality Castings' plan was a great believer in the self-reliance of the human being. His plan was cash, and he intended to keep it that way to promote self-reliance. That attitude is disappearing with the advent of higher fixed costs.

How To Do It

Three basic provisions are: 1. An established formula for distributing profits. 2. Knowledge of the formula by employees before distribution is made. 3. Eligibility of most employees.

Hurdles — Thoroughly consider a plan which covers all employees. Many management consultants believe that production employees do not affect your profits, and only management should share in them, but such thinking is open to question. Too many success stories seem to disprove it.

The council is adamant in its position: If you give profit sharing to one segment of your employees, you'll antagonize others.

Of course, you must sell profit sharing to management first, then follow with an intensive campaign that reaches the last floor sweeper. This is a team operation, experts warn. If you miss one man in

Ground Rules for Profit Sharing

1. Management must be convinced that the production worker can affect profits.
2. Stockholders and management must believe it is right to share earnings with the workers.
3. Any payments from profit sharing must be in addition to regular competitive wages.
4. Beware of tying profit sharing too closely with the acquisition of stock in your own company. Some plans of this type are spectacularly successful, but a number fail.
5. Don't make it too easy to get withdrawals from deferred profit sharing trusts.
6. Be sure payments from profit sharing will be enough to motivate production workers—at least 10 per cent of annual wages is common.
7. Maintain an open line of communications to keep employees informed about all matters affecting profits.
8. Thoroughly evaluate available plans before starting your own.
9. Maintain close relations with profit sharing organizations and other companies with similar plans.

ten, you may be in trouble.

Don't think you can eliminate any other incentive you now have —they are individualistic by nature. Piece rates are an example. In the ordinary plant, standard rates tend to be the ceiling. Once a worker goes over, he's accused of pushing too hard to the detriment of the group. Install profit sharing on top of piece rates, and you'll eliminate the ceiling because any individual effort is for the benefit of the group.

Types — Choose your type of plan carefully. Check these trends: 1. Among companies with cash plans, there is a trend to add a deferred plan. 2. Among new companies entering profit sharing, the trend is to deferred plans. 3. Waiting periods are becoming shorter. Once three years was the rule. Now it's moving to one year for deferred plans, about three months for cash plans. 4. Vesting times are becoming shorter. The trend is to allow employees full rights in their parts of a deferred trust after 15 years of service (if they leave the company).

In a Profit Sharing Research Foundation study, company executives rated the success of plans this way: Cash, 89 per cent; combination, 92 per cent; deferred, 96 per cent.

No Profits—Don't worry about the years when your profits are low, or even those in which you have none at all. Progressive firms with good employee communications survive profit slumps—even come out ahead. Said one midwestern president: "The year we had no profits made our plan. Employees knew we meant business with them."

Bell & Howell's Mr. Johnson thinks profit and loss sharing is a more fitting name than profit sharing. Employees have no fears once they learn management's thinking behind profit sharing. Remember, in a really bad year, you might have to cut wages. If all you do is lower profit sharing, employees know they're better off.

Summing Up

"Profit sharing is no substitute for anything. It is no cure-all. It is plainly and simply a management technique designed to implement industry's increasing emphasis on good employee relations," says Roy R. Lewis, employee relations manager, Pneumafil Corp. "It is, of necessity, a program which pays its own way."

Concludes Mr. Adams of Dings Magnetic Separator Co.: "Industry has made tremendous strides through better engineering techniques, better use of machines and time and motion study. We feel that if industry could tap the entire resources of the employee, progress so far would appear as a drop by comparison. Profit sharing can be a step in that direction."

Which method should this Production Man choose?

Is Hindsight better than Foresight? Sometimes it is – but not in *his* case. Controlling his inventory on the basis of PAST USAGE has led to shortages, overstocks, obsolescence, useless tying up of capital and a lot of other evils of unbalanced inventory.

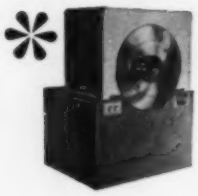
He's just realizing there's another way – a better way for him – PROJECTED FORECASTS. Sometimes the Hindsight method is better . . . sometimes Foresight is better . . . and this regardless of whether punched-card equipment or a manual system is used.

Are you sure which method is best for your company? Here's an easy way to find out. Turn to pages 6 and 8 of the free booklet "Inventory Control for Manufacturers." You'll get full particulars on both methods. Write Remington Rand, Room 1432, 315 Fourth Avenue, New York 10. Simply ask for KD406.

Remington Rand

DIVISION OF SPERRY RAND CORPORATION

How much are you paying for the machine that isn't there?



If you are machining this part, or one like it, you may be paying 49 cents more on every dollar—*in material alone*—than you need to pay.

For 49% less material was used by making it on a Torrington Rotary Swaging Machine, which reduces metal instead of cutting it away. A smaller rod was grooved, and a washer was swaged into the groove. Production jumped from 80 to 260 pieces an hour—with unskilled labor!

You can put many operations on a Torrington Swager—pointing, tapering, reducing, sizing, forming inside contours and threads. With savings like these, your swager will shortly pay for itself.

See for yourself what swaging is and what it can do. Let us show you our new, 20-minute, full-color film on swaging. And write for our new catalog on Torrington Rotary Swaging Machines.

THE TORRINGTON COMPANY
Swaging Machine Division
150 North Street, Torrington, Conn.

TORRINGTON ROTARY SWAGING MACHINES

Technical Outlook

SINTERED TITANIUM— Look for titanium powder parts to catch on. Two of the big reasons were cited by Arthur D. Schwope of Clevite Corp., Cleveland, at the ASM Titanium Conference in Los Angeles: 1. Titanium powder which is cheaper than billets is available. 2. It's possible to make a 1-lb part such as a bearing housing for a jet engine with 1.2 lb of sponge. The same part made from arc-melted stock would require at least 3 lb of sponge.

SOUNDING OUT DEFECTS— Engineers at General Motors' Central Foundry Division, Saginaw, Mich., have mechanized an old foundry inspection method—striking a casting and listening to its ring. A machine, called a Sonic Tester, strikes the casting with a steel clapper, determines its frequency of vibration and passes or rejects it.

ENAMELED ALUMINUM— Three new aluminum products—one grade of porcelain enameling sheet and two grades of extruded shapes—are superior in surface control, adherence of enamel and economy of production to the aluminum now being used, says Aluminum Co. of America. They assure uniformity of behavior of the metal throughout the enameling process, Alcoa explains.

PERCOLATING FOR MANGANESE— The Bureau of Mines is recovering 78 to 97 per cent of the manganese from low-grade Arizona and Nevada ores by percolation leaching. Sulphur dioxide is passed upward through piles of crushed ore to dissolve the manganese. Water or a solution of calcium dithionate is then percolated downward through the piles to capture magnesium sulphate which can be treated to yield a product for making ferromanganese.

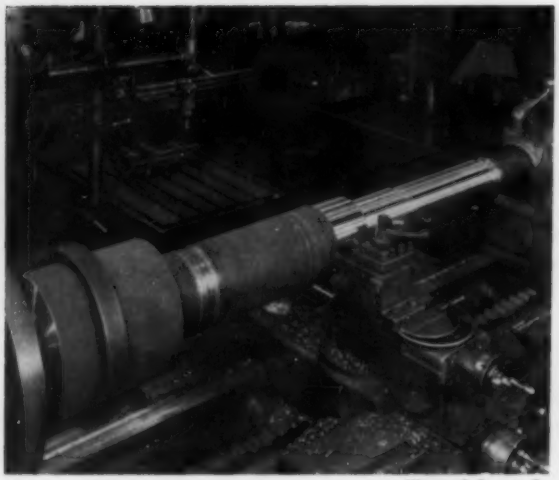
INFRARED LENSES— A new purified silicon material may help chemists identify new compounds in their search for better plastics and other synthetics, says Raytheon Mfg. Co., Waltham, Mass. Formed into prisms, lenses and windows, it allows invisible heat rays from materials at subzero temperatures to reach a sensitive infrared detector.

LOW-TEMP PORCELAIN— Enamelers are looking for increased use of porcelains which can be fired at temperatures lower than 1350°F. Producers expect significant savings through the use of non-premium, low carbon sheets in thinner gages. Other advantages: Less distortion and metal oxidation, better coverage of edges and welds.

STAINLESS WELDS— General Electric says it makes root pass welds on stainless pipe for atomic reactors without adding filler metal or backing rings. The secret: Root edges are machined with a raised edge on the near side and a slight bevel on the far side. Raised edges provide the metal. GE uses tungsten arc, inert gas.

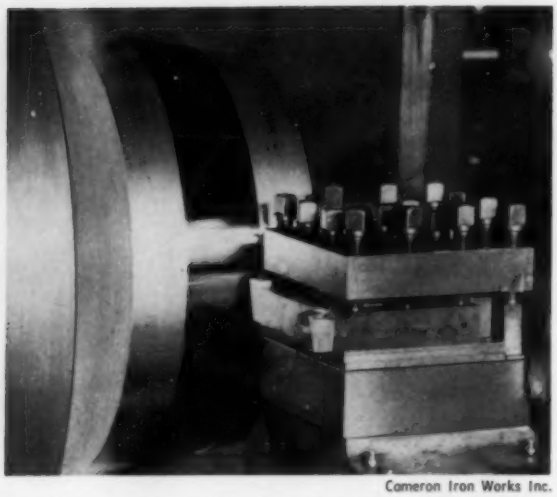
IMPROVED MILLS— The Foundry & Mill Machinery Division of Blaw-Knox Co., Pittsburgh, is developing a mill for aluminum foil. The company says it will yield wider (almost 50 per cent), thinner sheets at a speed double previous maximums. Also in the works: A structural mill which will "greatly surpass" the tonnage of any present unit.

Metalworking Outlook—p. 69 *Market Outlook—p. 177*



Warner & Swasey Co.

A ceramic tool wades into a C-1050 annealed steel forging. Cutting speeds vary from 485 to 710 sfpm on this job. Tool life for the cutters: 230 cu in. of metal removed per tip



Cameron Iron Works Inc.

Taper turning OD of steel forging takes five passes at 1130 sfpm, 0.012 ipr feed and 0.125-in. depth. Despite multipasses, ceramics cut time from 10.26 to 3.17 minutes

TRENDS IN TOOLING

How Ready Are Ceramics?

Experts say you can use them on finishing jobs now, but you'll have to select the jobs and apply the tools with care. Here are the major points

CERAMIC cutting tools have reached the apprentice stage. They're old enough to do some jobs well, but they still need the guiding hand of experience.

The conclusion is drawn from a number of reports on laboratory tests and production runs. At the Houston meeting of the American Society of Tool Engineers, a wide range of ceramic experience (and opinion) was brought together under one roof (STEEL, Apr. 1, p. 116).

The consensus: Ceramic tools, properly applied, are ready for cost cutting production jobs.

Advantages—High cutting speed is the most highly touted capacity of ceramics. On the right jobs, they will take metal off faster, and at lower cost, than any other tool material.

They also give work a superior surface finish — sometimes good enough to eliminate a subsequent finishing operation. Their hardness makes them a natural for machining abrasive materials like powdered metals and plastics.

Jobs for Ceramics

Nearly all ceramic experience has been gained in turning. Other operations, including milling, have been tried, but as is true with nearly every new cutting material, the lathe is used to gather the know-how.

The material will do its best work in finishing cuts less than ⅛-in. deep, where the depth of cut is constant and where there are no surface imperfections, metal inclusions or cut interruptions. Generally, the shallower the cut, the better the job.

Workpieces—You quickly run into obstacles where you must contend with surface variations. J. F. Allen, factory manager at Houston's Cameron Iron Works Inc., reported on his work with forgings at the ASTE meeting. He concluded: "The problem of using a ceramic cutter on a first roughing cut remains unsolved."

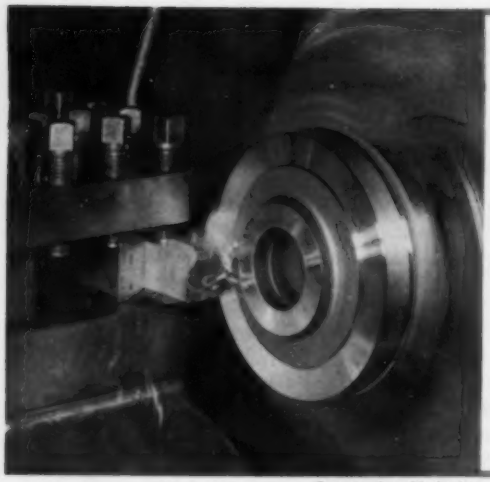
In his attempts at roughing, Mr. Allen tried to take off a full ¼-in. depth of metal from a rough forging, using a cutting speed of about 450 sfpm and feeds ranging from 0.012 to 0.030 ipr. He says: "The results of this and all similar tests were discouraging."

Mr. Allen and his associates tried a number of techniques without success, including "rather drastic" changes in rake angles, severe honing of the cutting edge, shotblasting of the as-forged surfaces and altered nose radiuses.

Those results are typical. Under heavy chip loads, the ceramic, with its low transverse rupture strength, breaks up. This low strength will prevent it from becoming a general purpose tool material.

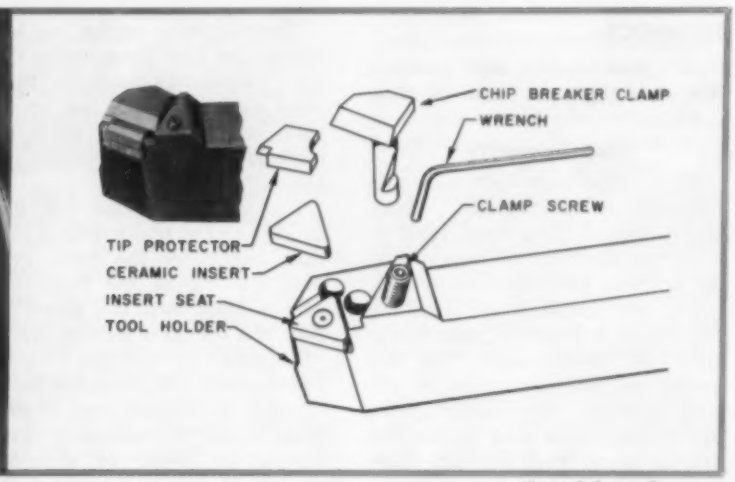
Finishing—Mr. Allen's tests on ceramic's ability as a finish cutter were in agreement with others. He says: "We came to the early conclusion that its success as a finish tool is practically assured through the following of fairly simple rules."

At Warner & Swasey Co., Cleveland, tooling experts have been studying ceramics for several years. Wrapping up their experi-



Cameron Iron Works Inc.

Roughing through another forging, the ceramic cuts at 1200 sfpm. Depth was ⅛-in., feed was 0.018 ipr. Carbide time was cut by 75 per cent



Warner & Swasey Co.

Cutter assembly is designed to protect that part of the tip not doing the cutting. It was developed to prevent damage due to impact of the chips. Inset shows assembly

ence for presentation at the ASTE meeting, A. O. Haeme, tool superintendent and Robert T. Hook, chief metallurgist, also pointed out: "Ceramic tools have a definite industrial use in finish turning operations."

They went further: "With proper care, ceramic tools can be used successfully on first and second operations on turret lathes."

To support this statement, Messrs. Hook and Haeme cited a test they ran on a C-1050 annealed steel forging. The part is about 55 in. long and has three separate diameters. The goal was a 0.005-in. tolerance and a pregrind finish on all diameters.

The first diameter (6⅛-in. OD, 18⅜-in. long) was cut at 485 sfpm with a feed of 0.015 ipr. Depth of cut was 3/32-in. The second diameter (6¾-in. OD, 8 in. long) was cut at 535 sfpm with a 0.015 ipr feed and a 3/32-in. cut depth. The third diameter was 8¾-in. OD, by 29 in. long. Feed and depth of cut were the same as for the other two diameters.

Under those cutting conditions, W&S engineers got two full pieces per tool tip. This amounted to about 230 cu in. of metal removed per tool. The tip was held in a standard strap-type negative toolholder. The ceramic slug, ½-in. square and 1½-in. long, had a chip breaker ground in the top amounting to a 0.070 in. width and 0.015 in. depth for the entire section parallel to the side cutting edge. A 1/32-in. nose radius was used, and a land was honed on the cutting edge 30 degrees from the vertical to a width of 0.010 in.

Job Requirements—Despite this evidence that ceramics may work on some refined rough cuts, fine finishing is the place to start. The goal should be to find a job where the speed or an improved surface finish will pay off and where close tolerances must be held.

Speed of cutting can be misleading. The cutting part of the cycle must be long enough to make faster cutting a time saver for the whole cycle. In a turning operation where floor-to-floor time is 10 minutes and turning time is only 2 minutes, you may have a hard time justifying ceramics. A 50 per cent reduction in cutting would still leave a 9-minute machine cycle.

The ability of the material to turn out a good surface finish has been demonstrated conclusively. It's probably due to either of two factors or a combination of them.

First, metalcutting experts agree that high speed cutting is more efficient than low speed. There is more shearing of metal from the workpiece, less tearing. Hardness and strength at high temperatures give ceramics the potential of higher speeds. Proof: A recent W&S test was run on 1040 steel at 16,454 sfpm. The speed is impractical but indicative of ceramic's high speed properties.

The second factor is surface improvement. The chemically inert tips are resistant to welded built-up edges common on other tool materials. Intermittent sloughing of this weld between the tool and the work tears the surface.

Alloys—Ceramics show promise in machining hardened steel alloys up to 60 Rc. Norman Zlatin, consultant, Wright Aeronautical Division, Curtiss-Wright Corp., Wood-Ridge, N.J., cited a test on AISI 4340 steel with a 400 Bhn hardness. Running at 400 sfpm with a feed of 0.009 ipr and a 0.030 depth of cut, ceramics had a 39-minute tool life. Under identical conditions, a C-8 carbide lasted 18 minutes.

Surprisingly, ceramics seem unable to handle the extreme chip loads of the high temperature and titanium alloys. Mr. Zlatin says: "Tool wear is rapid when machining titanium. In the case of high temperature alloys, the ceramic chips readily and failure occurs."

Cuts—Speeds will usually fall in the 700 to 2000 sfpm range. They will be 50 to 100 per cent greater than carbide speeds for the same cuts. Feeds should be lighter than those for carbides, say in the 0.002 to 0.020 ipr range. Coolant is seldom used.

Depths of cut should remain

CERAMICS . . .

light. Best results will come on fine finishing cuts 0.060 in. deep and less.

Tool Geometry

With sufficiently light cuts, tool geometry is no problem. Many fancy designs have been tried to solve the problem of heavy cuts, but with no great success.

The inherent weakness of ceramics makes a negative rake advisable. Mr. Zlatin says: "The tool angles are not as critical as one may suppose. For most turning operations, these tool angles are satisfactory: Back and side rakes both 7 degrees negative; side and end cutting edges both 15 degrees; with a 7 degree relief and 0.030 in. nose radius.

"Positive rake angles are satisfactory for light feeds under 0.005 ipr. Toolholders made for throwaway carbide blanks can be used with ceramic blanks, since such toolholders provide similar tool angles."

It's imperative that the blank be held to the shank with a clamp that distributes the force evenly over the top of the blank. It's also a must that the shank support the complete cutting tip.

Although ceramic tips have been satisfactorily brazed or cemented to shanks, the strong trend to switch from brazed to throwaway carbide inserts is bound to extend to ceramics.

Ceramic blanks can be ground with conventional diamond wheels, and grinding techniques are the same as those used for carbide tools. A tendency to load the wheels makes it necessary to use coolant when grinding.

Machines

Not all machine tools will be able to get the most out of ceramic cutting tools. In some cases, the absence of an adequate machine will make the switch uneconomical.

High speed is the first requirement. In some cases this may mean 2000 rpm. On facing cuts, or where diameters may differ in the same cycle, constant cutting speed control is recommended.

The machine must be free from vibration, and all feeds must be positive. Finally, the machine must have the power to remove metal at high speeds.

TRENDS IN TOOLING

A Look at Plastic Tools

Their properties are being improved to widen their range of application. Hot forming and drop hammer dies are singled out as growth areas to watch

YOU CAN'T use a rule of thumb in designing plastic tools. Requirements often border on the material's ultimate properties.

"For that reason," says William R. Weaver, president, Modern Pattern & Plastics Inc., Toledo, "the tool engineer and fabricator (must) acquaint themselves with these properties to insure adequate and soundly engineered tools."

Speaking at the Houston meeting of the American Society of Tool Engineers, Mr. Weaver concluded: "Plastics will do an excellent job when properly applied."

Plastic Jobs—He gives them this scope: Metal forming, checking gages and fixtures, plastic molding and foundry applications.

"In metal forming," he says, "every job is a problem of its own because of the many variables in metal flow." But he feels there are guideposts to good tooling practice. Here are some he cites:

- Draw radiuses are a major source of concern. Those which are three to five times the metal thickness give best results. Metal inserts will be required for production runs of 1000 or more.
- The heat distortion limit is a prominent factor in die life. Repeated operation will cause heat to pass from the stamping to the die. The material will resist the heat momentarily but will gradually retain the heat until the heat distortion point is reached. Then failure comes rapidly.
- Ironing and spanking applications are not good practice. Although the impact strength of resilient plastics is high, fatigue strength is low. Once a wrinkle has formed in the stamping, the die will be of little value. The

Repair on this stretch press block starts with cleaning and filing cracks

plastic tends to deform to the shape of the wrinkle.

• Due to the material's resiliency, ironing of wall sections is not recommended. There's not a sufficient compressive force.

• Excessive burrs on metal blanks must be removed. Plastic rings are undesirable. Severe galling will occur over the path of the blank having excessive burrs. Blank cleanliness is a must.

Fixtures, Gages—According to Mr. Weaver, most applications today are in this category. Here are his tips for fixtures:

• Plastics have a low modulus of elasticity and will deform under loads. Be sure fixtures have sufficient "beef" to withstand normal operating loads. Also provide an adequate base to support the tool.

• Gage pins, locating blocks and areas of apparent abrasion should be constructed of conventional tooling materials. Metal edging of areas subject to frequent contact is advisable.

• Abrasion is particularly troublesome when fixturing and gaging castings. Use metal inserts liberally.

• Observe surface temperature. In hot applications, use intermittent contact. A rotating drill in a bushing, for example, may soften the plastic adhesive holding the bushing in place.

Foundry Jobs—Mr. Weaver looks for growth in demand for plastics in foundries. They are particularly good for cope and drag patterns. Surface wear, he points out, is comparable to that of aluminum and magnesium patterns.

Corebox applications are working well, both in hand ram and blow operations. Coreboxes should be supported by metal fabrication, usually a cast container.

New Plastic—W. Robert Price, General Mills Inc., Minneapolis, says plastics already have firmly established themselves. "Places have been found where they act not merely as replacements for metal but also perform jobs which cannot be done nearly as well by metals."

By alloying Versamid polyamid resins (the nylon family) with epoxies, engineers hope to broaden this application range. Mr. Price, project manager of plastics and resins development in General Mills' Chemical Division, indicates that alloying will bring impact resistance, abrasion resistance and toughness to the epoxy group. It effectively makes up for most of the epoxy's weaknesses.

These alloys already have been used successfully for master models, checking fixtures, draw dies, vise and chuck jaws, spinning dies, drop hammer dies, stretch dies, drill jigs and trim and routing fixtures.

A drop hammer die, for example, was fabricated at McDonald Aircraft Corp., St. Louis. It absorbed high operating stresses without chipping, cracking or wearing. Maximum depth of the draw is about 1 in. with aluminum.

Future—These drop hammer dies constitute one area for future growth. Look also for growth in hot forming dies. The areas were among those pointed out by Lewis F. Bogart, sales engineer, Marblette Corp., Long Island City, N. Y.

Mr. Bogart says: "Some metals such as magnesium and titanium must be formed hot. Since the emergence of plastics capable of withstanding moderate loads and stresses at temperatures over 400°F, new interest has been shown in using them to form these hot metals."

He adds that plastic drop hammer dies have been constructed with varying success. "In the past, flexible materials have age hardened, and the plastic has been only fair for this application. The emergence of much higher impact materials and better fabrication should lead to more success in this field."

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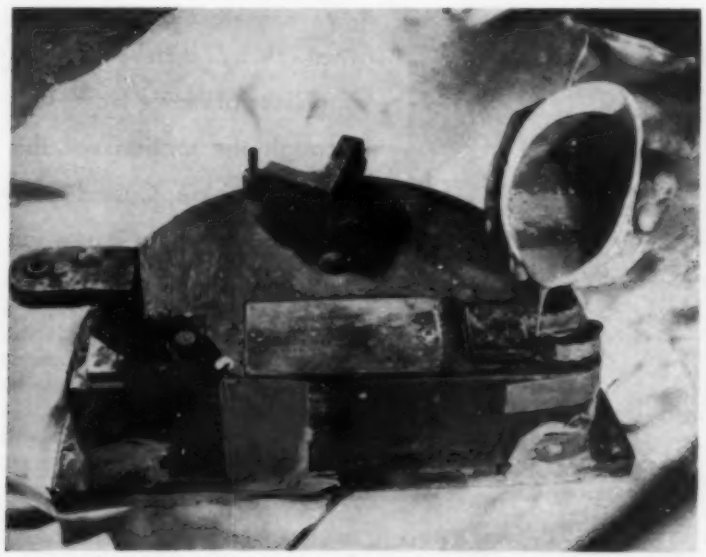
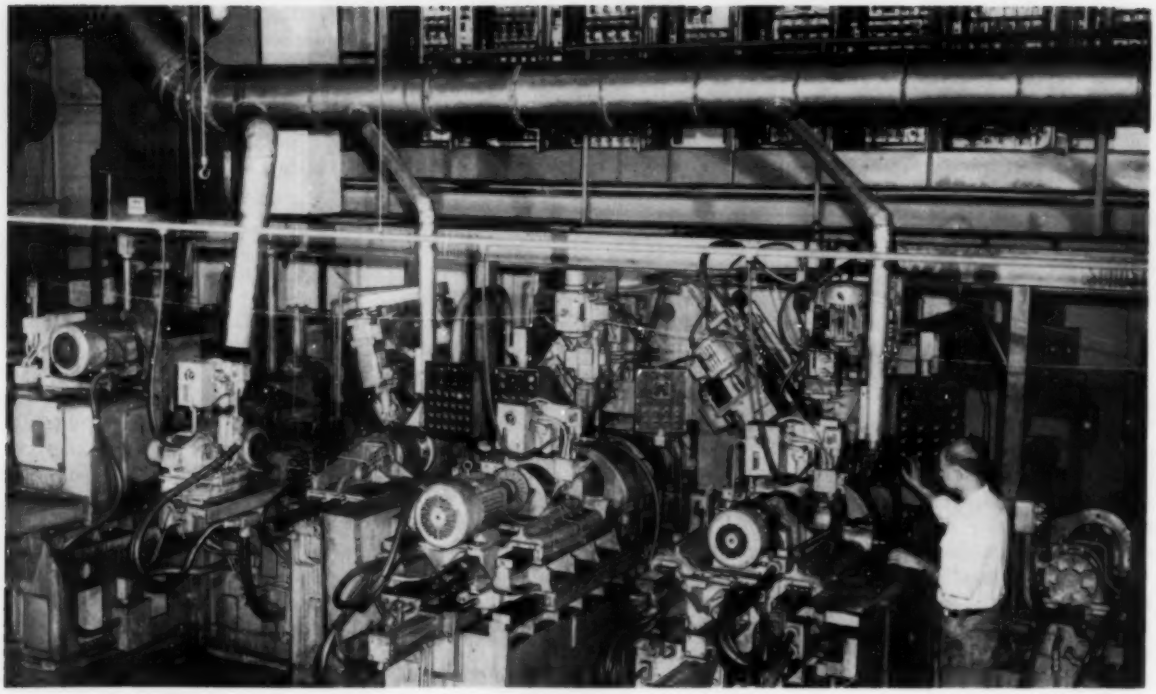


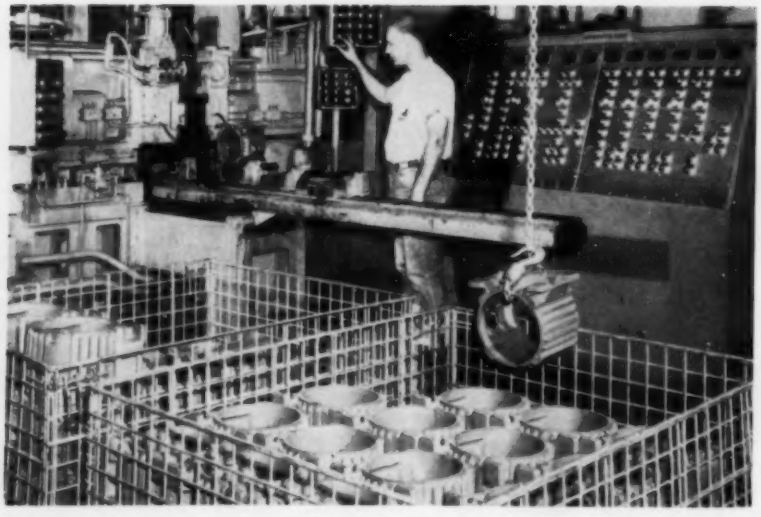
After cracks are cleaned, the technician dams them with cloth masking tapes and clay. He forms a clay spout and slowly pours in epoxy resin

Photo shows the tool after it has been repaired. Total cost of job: $21.50



Using a sectional pendant station, the setup man goes through a test run. Spacers are used to set up the machine. They're color coded—each color for a different motor frame size

Transfer Machine Does 36 Jobs



At the entry end of the machine, the operator hand loads frames on the work transfer shuttle

That many different types and sizes of motor frames go through the stations of this in-line machine. Coded spacers speed setup for a new job

THEORETICALLY, one of the basic differences between a standard and a special machine has to do with versatility. But it's becoming more and more difficult to define this difference in simple, yet accurate, terms.

Many of the so-called standard machines are adapted and tooled for single-purpose jobs. Simultaneously, the designers and builders

of specials are working versatility into their products at every conceivable opportunity.

Success—That they've made significant strides is borne out by a new transfer machine at the new Ashtabula, O., plant of Reliance Electric & Engineering Co., Cleveland.

Built by Sundstrand Machine Tool Co., Rockford, Ill., the machine works only on motor frames, but it machines 36 different frame castings. Each requires a different machining setup.

Setup time varies. Changing the same diameter frame from one length to another takes about an hour. Change-over from one enclosure to another or from vertical to foot-mounted also requires about 1 hour. A complete change from one diameter to another takes 9 hours.

Color Code — Speedy change-overs are done by using special accessories. Colored spacers are used to position limit-switch dogs. The setup man completely changes all tool positioning by removing or adding a spacer to every position. A check list is used to show correct spacer positioning.

The machine has nine operating stations, a load station, an unload station and a turnover station. It faces bores, mills, drills and taps the frames.

Each station has a pendant control for independent operation. In setting up, the operator changes tools and trys one section at a time. After he has changed all stations, he runs one frame through, and then it's completely inspected.

Production varies from 42 to 70 frames an hour. As few as 40 identical frames per lot can be handled economically.

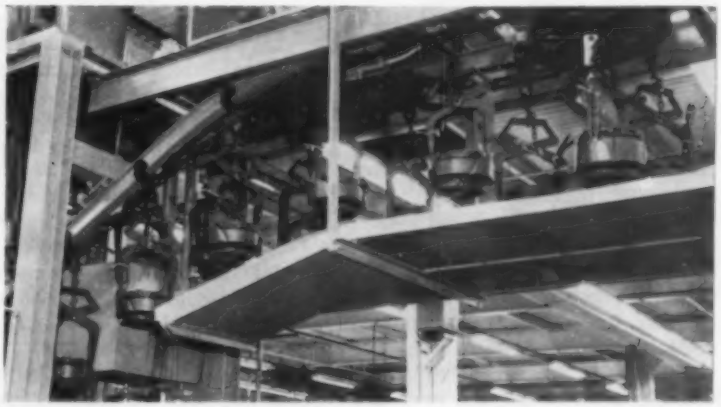
Comparison—Reliance engineers say the machine does the work of a milling machine, 11 vertical turret lathes, a multispindle drill and a five-spindle drill. They estimate the transfer machine cost 25 per cent less than the total price of this standard equipment. In-line operation also saves about 75 per cent of the floor space that would be required for the standard machines, and it reduces the manpower requirements from 15 operators to three.

Plant Highlights

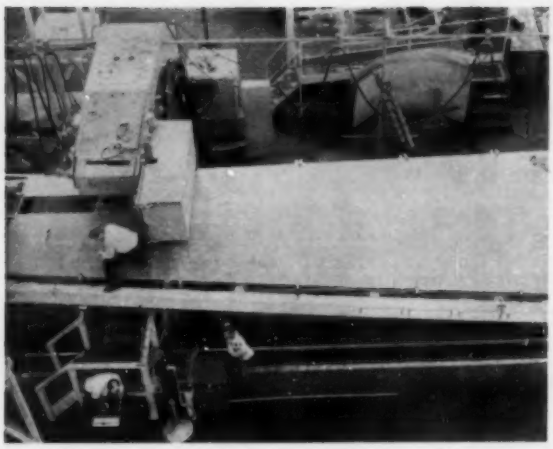
TO BOOST production of alternating current and direct current motors at its Ashtabula, O., plant, Reliance Electric & Engineering Co. management added 100,000 sq ft and a host of new equipment. In addition to the versatile transfer machine, here are some key installations:

An operator rides a high-lift truck to guide parts in and out of storage racks. A die-loading attachment powers parts on and off the lift

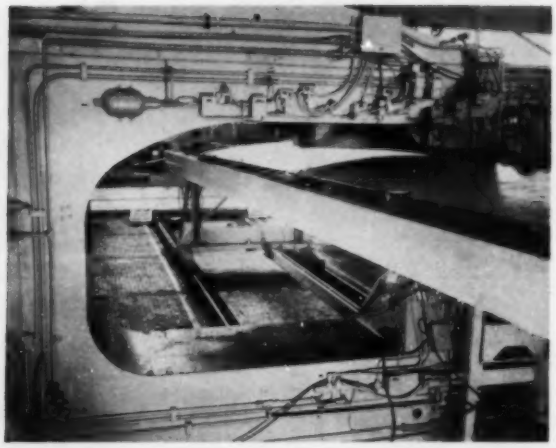
Two Henry & Wright dieing machines are hooked in series to produce rotor and stator laminations from the same stock. The coil feeds through a straightener into the first press where the rotor cookie is punched out. The strip then moves directly into the second press where the stator donut is punched. The line can turn out 120 of each lamination a minute



After the cores are dipped and baked, they move on this conveyor to a sealing tank. Some orders need extra varnishing and baking, so small metal tags hung over these cores break an electric eye and prevent sealing on that part only



Wing panel of the P6M SeaMaster in the Drivmatic machine. Stringers are riveted to its underside automatically



Close-up of the machine. Riveting and drilling can be completed seven times faster than with hand methods

Fabricates Wing Panels Automatically

Stringers are drilled and riveted to the 10 x 37 ft wing panel of the Martin P6M SeaMaster multijet seaplane by a new tape-controlled riveting machine

AUTOMATIC fabrication of wing panels has been developed by Glenn L. Martin Co., Baltimore, to make fuel-tight wings for the P6M SeaMaster that can be used as tanks without liners or secondary containers.

No sealant is necessary in the automatic riveting process. The Drivmatic machine clamps the work in position, drills and countersinks the rivet hole, injects a refrigerated slug (headless) rivet, upsets the bottom of the slug, upsets the top into the countersink, mills the top head flush with the wing surface, unclamps the work and resets itself for the next sequence.

Tape Control—A tape command device controls the entire operation. Coded holes punched in seven channels of a standard 35-mm movie film pass beneath electrical contacts regulating the functions of the equipment. The contacts translate the holes into electrical signals which actuate electromechanical and hydraulic units.

Holes are located on the tape by manually positioning the assembly in relation to the tape. Holes are pierced with a hand tool.

Rivets — The slug rivets are straight rods of 2024 aluminum alloy cut to length with ends squared and chamfered. The rivets are heat treated, stored at −20°F and must be driven within 20 minutes after exposure to room temperature when they begin to age and are unsatisfactory for driving.

The rivets are squeezed, then vibrated. The riveting machine can perform both operations, although more electrical settings are required with automatically controlled vibrating. Rivets can be inserted in restricted spaces. The Drivmatic applies a 1500-lb clamp during the riveting process.

Frame—Components of the machine are supported in a steel C-frame, 12 ft high with a 10 ft jaw depth. The lower ram of the C-frame heads the bottom of the rivet, provides the high pressure clamp and has a profiling mechanism which automatically controls the edge distance along the stringer. The upper head of the frame contains the drill spindle, mill spindle and rivet gun with injector fingers.

A handling frame, to which the wing panel is attached, guides and delivers the workpiece to the drill and rivet location. It can move vertically, transversely, longitudinally or radially. Each end of the frame is controlled independently, permitting the workpiece to be located in any required position.

MATCHLESS STEAM HOSE

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All-basic progress:

At South Works, U. S. Steel Corp.—Longer roof life.

At Harbor Works, Inland Steel Co.—Lower fuel consumption.

At Keystone Steel & Wire Co.—Installing fourth all-basic.

At each installation above—Greatly increased production.

Good News About All-Basic Open Hearths

At the Chicago AIME open hearth meeting, steelmakers learned about all-basic roof progress, prefabricated furnace fronts and techniques for fast light-up

AT THE END of 1956, the all-basic open hearth furnace at South Works, U.S. Steel Corp., Chicago, completed its thirteenth campaign. It had been in operation since June, 1947.

During that time, it produced 6868 heats. For the same period, silica furnaces in the shop tapped an average of 6190 heats. The additional 678 heats represented 87,600 tons of steel, an average advantage of 9220 tons yearly.

Steelmen heard about the all-basic at the annual meeting of the Chicago Section, National Open Hearth Committee, American Institute of Mining, Metallurgical & Petroleum Engineers.

Speaker—The cost of operating the furnace has been slightly greater per ton of steel made, said John Harrod, assistant to division superintendent, steel production, South Works. But cost per ton has been cut in the last several campaigns. It is now nearly equal to the silica furnace figure. Not to be overlooked is the fact that the 130-ton furnace has contributed an additional 87,600 tons of steel at a time when output was in great demand.

Mr. Harrod said results encourage installation of more all-basic furnaces. The experiment has resulted in extending to the silica roof furnaces many features originally tried on the all-basic. With the exception of the roof, many silica furnaces now are almost identical to the all-basic.

Construction — During the 13 campaigns, changes were made in furnace design, and many types of basic brick and several types of burners were evaluated. Mr. Harrod asserted that double, internally plated, chemically bonded chrome magnesite bricks showed superiority. They proved less susceptible to spalling or peeling.

In all campaigns, the roof has been of suspended arch construction, combined with a movable rear skew channel. In the last two-year period (during which furnace design and type of roof brick underwent little change) a unit roof life of 255 heats has been achieved, compared with 102 heats for the silica furnaces—a ratio of 2.5 to 1. The current campaign promises to be the best to date, with a ratio of nearly 3 to 1.

Production — The furnace was not given preferential treatment, although the firing rate was maintained at 10 to 25 per cent in excess of the shop average. During the melt-down period, it has been fired at a 10 to 15 per cent greater rate than the silica furnaces. At the same time, firing rates on both types have been increased by about 20 per cent. Fuel is oil and natural gas with steam atomization.

Production rates on the all-basic have been greater in each campaign than the average of the silica furnaces. The advantage has ranged from 6.1 to 21.9 per cent. (The average is 13.3 per cent greater.)

Inland—Paul Nutting, assistant superintendent, No. 2 open hearth, Inland Steel Co., E. Chicago, Ind.,

"Electric and Open Hearth Steel Castings from 1 lb. to 100 tons"

Photo Taken at
WEST VIRGINIA STEEL CORP.
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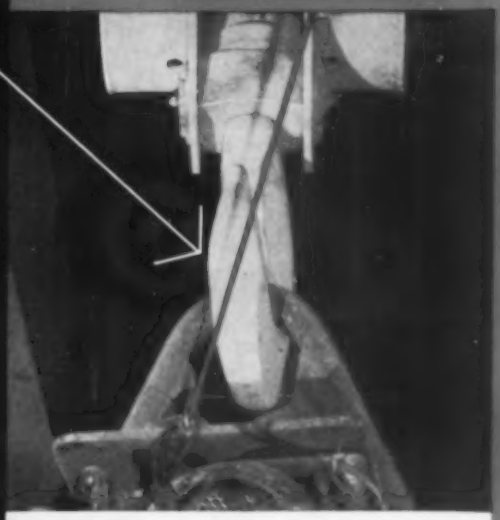
portable ingot stripper



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PROGRESS . . .

commented that his company has been experimenting for a number of years with the basic open hearth and since 1947 has had basic ends in furnaces in its No. 2 shop. The basic end produces 17 per cent more tonnage than the silica end. They cost a little more to repair and maintain, but the cost per ton of steel runs about 2 per cent less.

Inland had been seeking longer campaigns. The idea of the all-basic furnace was sold to management on that basis, rather than on the basis of increased production. Constructing an all-basic unit from one of the basic end furnaces required no substantial changes. A flat roof line was used instead of the sprung arch roof. The brick have embedded steel plates. The roof design has proved satisfactory, said Mr. Nutting.

Results—Warm-up practice for the all-basic furnace was the same as for silica furnaces. The first heat was tapped 50 hours after start, or 2 hours longer than with the silica unit. Slight spalling of the brick occurred after the first heat and continued during the campaign (Inland uses the oxygen lance on every heat). After 198 heats, it was necessary to patch the roof, replacing 13 per cent of the surface. At various times during the campaign patching was required.

The first campaign was 535 heats. During this time, the production gain exceeded 12 days output, compared with silica furnaces. In four campaigns, cost of refractories was 18.3 per cent higher than for silica units; fuel consumption was lower and output higher. It is expected that further campaigns will yield still better results.

Keystone—In discussing the two all-basic furnace papers, A. H. Sommer, vice president and general superintedent, Keystone Steel & Wire Co., Peoria, Ill., revealed that his company will have its four open hearths on all-basic operation in the near future. In four campaigns (in three of which the flat roof was used) production increased about 15 tons per hour. He thinks this will go to 16 tons with the fourth furnace on all-basic practice. Heats run from 175 to 178 tons. Fuel is 70 per cent natural gas and 30 per cent oil.

Advantages of the all-basic furnace, according to Mr. Sommer, are the higher firing rate and higher steel output. There is a possibility that basic brick may be used in other parts of the furnace. He pointed out that some European shops shut their furnaces down over week ends, and this might become important in the U.S. if wage differentials for week-end work get more severe.

Prefab — New fronts for open hearths are prefabricated at Granite City Steel Co., Granite City, Ill. A. W. Schoenebeck, superintendent, maintenance and construction, described how the procedure saves time and money. His company is expanding its present open hearth capacity of 1.08 million tons a year about 30 per cent without adding new furnaces to the three 285-ton and four 250-ton units.

A key element in the expansion was the replacement of the furnace fronts. Management wanted a method of replacing the fronts that would combine economy with minimum down time. Furnace availability had to be kept at a maximum.

Big Boxes—The new fronts were necessary to accommodate what are said to be the largest charging boxes in the industry — 61 cu ft. Replacing 32 cu-ft boxes, they could not be used until larger furnace doors were installed; larger doors meant relocation of the buckstays.

The changes were made at time of a regular general repair. Design work was done by the engineering department and all assembly and installation by the maintenance department. Each front was fabricated before the furnace went down.

Prefabrication was done at the extreme end of the charging floor. Completed fronts weigh about 80 tons. They were picked up by the bails of the hot metal crane and carried to the furnace locations. Changing of the fronts lengthened the time for a general repair, but much furnace availability was gained. The over-all job (general repair and front change) took 4 to 4½-days, compared with about three days for an ordinary general repair.

Light-Up—A procedure for lighting up open hearths following rebuilds by burning gas in the checker chambers was described by T. D. Hess, Youngstown Sheet & Tube Co., Youngstown. He pointed out that the old method of lighting took close to 48 hours. It was impossible to get a 1200°F temperature in 8½-hours, and the flues wouldn't draw. When burning gas in the checker chambers was tried with a new hard-rammed bottom, the first heat was tapped in 66 hours.

A problem is to get the water out; moisture tends to condense on the doors. Thermocouples are placed in the furnace roof and other locations to indicate progress during the lighting-up period. Since there is some hazard in burning gas in the checkers, the thermocouple indicators are at the station of the first helper who is downstairs where he can watch the fires.

Spiders — Lawrence Kraay, assistant superintendent, No. 2 open hearth, Inland Steel Co., said practice in his plant is to install a spider and burn gas at various spots inside the furnace. When the temperature is brought up to 1200°F, the burners are lighted. He commented that the new procedure used by Youngstown looks good.

Pointing out that his plant has one stationary and three tilting open hearths, E. F. Franzen, assistant superintendent, open hearth and electric furnaces, Chicago District, Republic Steel Corp., said that after a major rebuild requiring five to six days, the problem is to get the checkers heated. Practice is to start gas burning in the pockets 4 or 5 hours before the pockets are finished. A spider also is used in the furnace.

Leonard Gourley, general melter foreman, open hearth department, Wisconsin Steel Works, International Harvester Co., Chicago, said his company is not pressed to get furnaces back on and employs the spider method for lighting up. Stephen Penny, superintendent, No. 1 open hearth, Gary (Ind.) Works, said practice at his plant is to use wood fires and burn some gas and oil. Meanwhile, charging begins and by the time the furnace is up to temperature and ready to go, it is fully charged.

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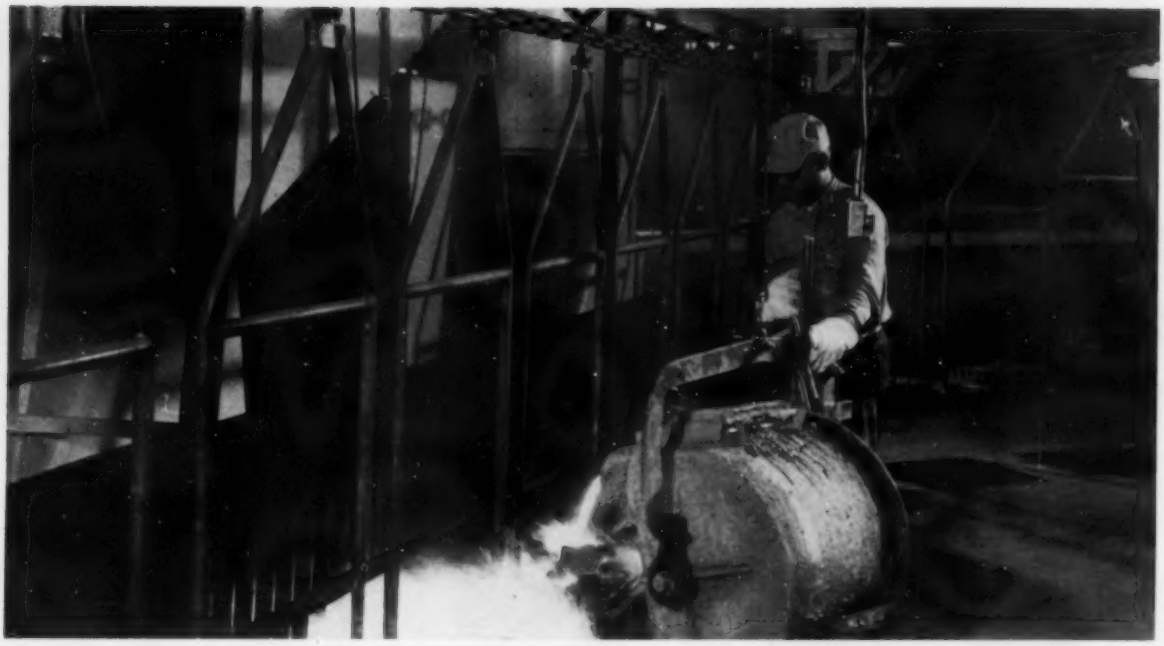

Pouring shells in a horizontal position like this makes for minimum handling. Fumes from burning resin binder are carried away by ventilator

More Shell Castings for Autos

Engineers are being won by their finer surfaces, draft angles of less than 1 degree and better dimensional stability. Here's what General Motors is doing with the new method

AUTO MEN are looking on shell molded castings with increasing favor. Even though they often cost more than conventional green sand castings, Detroit designers will continue to specify more shell molded parts.

H. G. Sieggreen, chief engineer, Central Foundry Division, General Motors Corp., Saginaw, Mich., told the ASME in New York that auto men are attracted by the lower cost of processing shell molded parts. Savings, he said, stem from better surface finishes, closer tolerances, less or no machining and lighter castings.

Mr. Sieggreen likes the speed and simplicity of the process. Complicated molds with narrow, accurate passages and cross sections aren't difficult—to some extent you can even reproduce engraved surfaces.

Machining — Shell castings are catching the eye of efficiency experts out to lower machining costs. Surface finishes of 250 microinches rms are common. Dimensional tolerances are close enough for all but wear and contact surfaces. The contoured areas on some parts that used to be profile milled can now be used as-cast.

Even on surfaces which are machined, shell castings offer cleaner surfaces. Sand inclusions are tough on cutting edges, and cleanliness means higher cutting speeds, more production and lower tool costs. Less metal to remove lowers freight costs from foundry to fabricator.

Roster—Some of the parts General Motors casts in shells are illustrated, including governor bodies, valve bodies for automatic transmissions, adjuster nuts for conventional steering, camshafts, flange yokes for propeller shafts (sometimes called torque tubes) and drums for automatic transmissions.

Mr. Sieggreen cites the flange yoke as an example: Made of Armasteel (pearlitic malleable) it replaces a forging which was machined on the outside and inside of the body to insure correct balance and wrench clearance for four bolt holes. Close dimensional control and small draft angles in the shell eliminated the machining and permitted the addition of ribs which greatly increased the fatigue life of the part. Other advantages named: Elimination of pattern shifts, a hole through the splined tube without the use of a separate core, sharper details, and well filled out corners and edges.

Recent Method — Shell molding gets its name from the mold, which

Mr. V. N. Agather, Vice President of Production at La Consolidada, S. A., Mexico, Manufacturers of Malla-Lac—Concrete Reinforcing Wire Mesh.

—he helped make it possible
with Sciaky Resistance Welding Techniques

Not only are Mexican swimming pools made with La Consolidada concrete reinforcing wire mesh, but office buildings, commercial structures and private homes as well. Critical shortages of lumber and fabricated structural members in Mexico force the extensive use of reinforced concrete construction.

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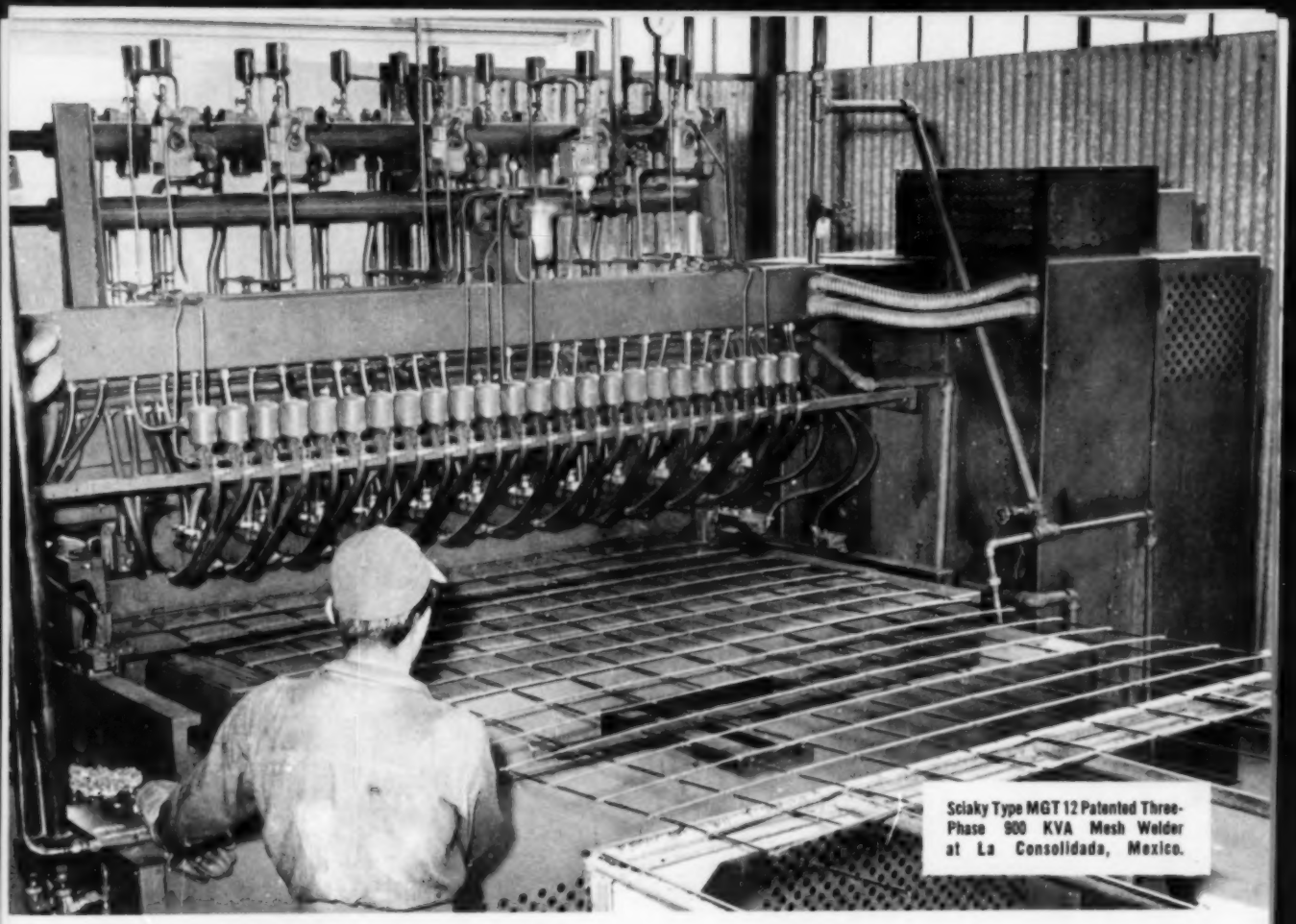
There are Sciaky plants in Chicago, Paris and London, as well as an Application Research Center in Los Angeles, California



Sciaky Type MGT 12 Patented Three-Phase 900 KVA Mesh Welder at La Consolidada, Mexico.

La Consolidada Offers 32% Savings in Steel to Building Construction with Concrete Reinforced Wire Mesh

***Sciaky Resistance Welding Techniques* used exclusively to introduce concrete reinforcing wire mesh to Mexico**

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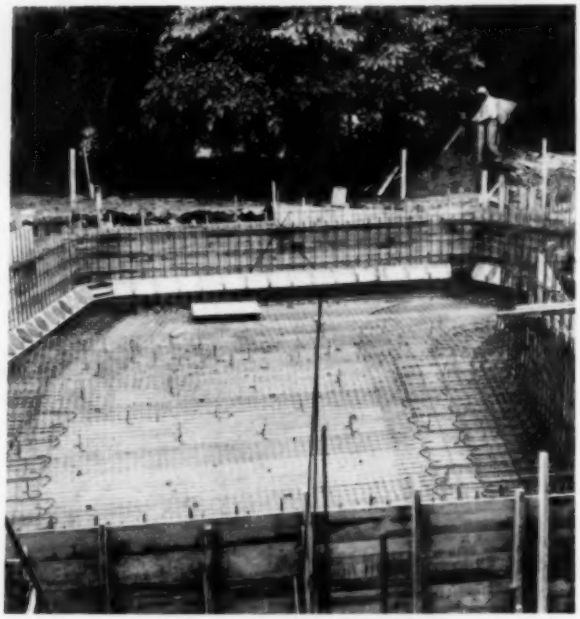
Further data is given in the publication "Resistance Welding At Work", Vol. 5, No. 2. Write for your copy.



La Consolidada Concrete Reinforcing Wire Mesh As Used In Construction of Swimming Pool.

Sciaky Bros., Inc., 4930 West 67th Street, Chicago 38, Ill., POrtsmouth 7-5600

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is a shell or wafer sand bonded by a phenolic resin.

The process can be automated. Several types of machines can be purchased, although some people like to make their own. Most equipment works with a dry mix and a dump box. Resin coated sands are gaining popularity.

The caster starts with a metal pattern which reproduces only half a part. It is heated to 425-450°F, placed at the end of a dump box and covered with the sand-resin mixture. The heat melts the plastic which flows through the sand to the pattern surface. Excess material is removed by dumping.

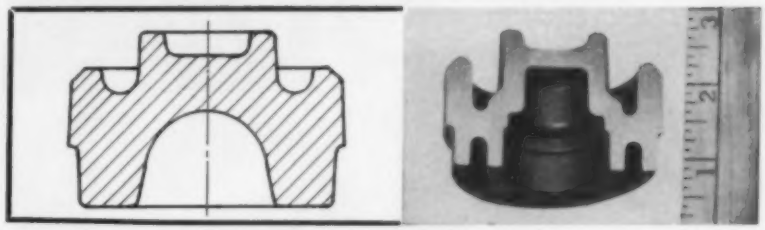
The pattern, and whatever sand-resin mixture adheres, are placed in an oven at 1050 to 1200°F for 30 to 60 seconds. The cured shell is stripped from the pattern by ejector pins which work like those in diecasting. Matching halves are glued and clamped together to form a mold.

Practice—The Central Foundry Division pours all its shells in a horizontal position. The hot metal burns out the plastic so that it is quite easy to separate (shake out) the solidified casting from the mold.

Progress Ahead — The slightly higher initial cost of a shell molded casting is due primarily to the high cost of the phenolic resin used as a binder. There is a lot of research under way to develop less expensive binders. Some castings cost less than green sand castings, particularly when cores can be eliminated.

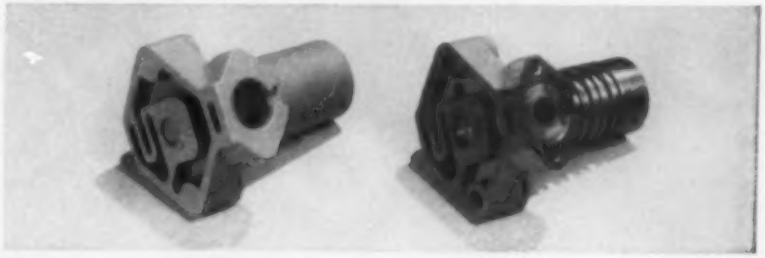
Mr. Sieggreen thinks shell molding soon will be the cheapest way to produce small parts.

Where Auto Men Are Using Shell Molded Parts

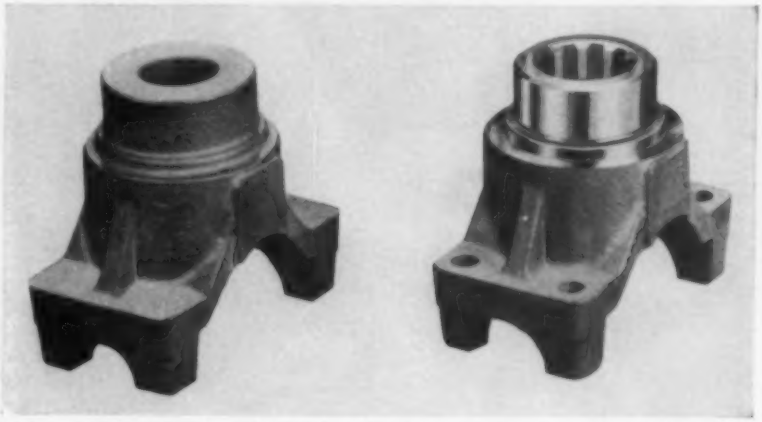


SAND CAST **SHELL MOLDED**

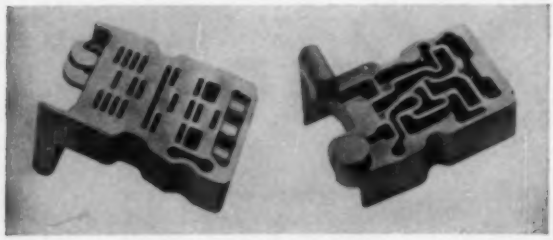
This steering gear adjuster nut is a good example of how shell molding can improve a sand casting. Note the heavy sections in the sand cast piece. Draft angles vary from 2 to 10 degrees. The shell version uses draft angles of 1 degree or less. Deep pockets lighten part and reduce machining



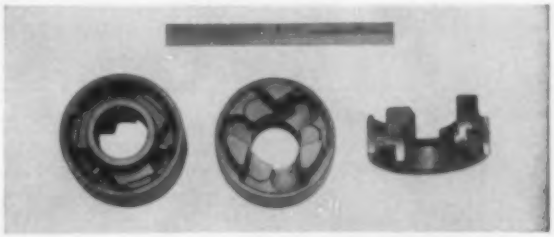
This governor body for an automatic transmission used to be an aluminum diecasting. Gray iron wasn't considered at first because of the difficult coring problem. Shell molding made the part relatively simple to cast



This automotive flange yoke used to be forged. Most important advantage: Elimination of machining on the outside and inside of the body, which was necessary for balancing and for wrench clearance around four bolt holes. Ribs were added to improve fatigue life

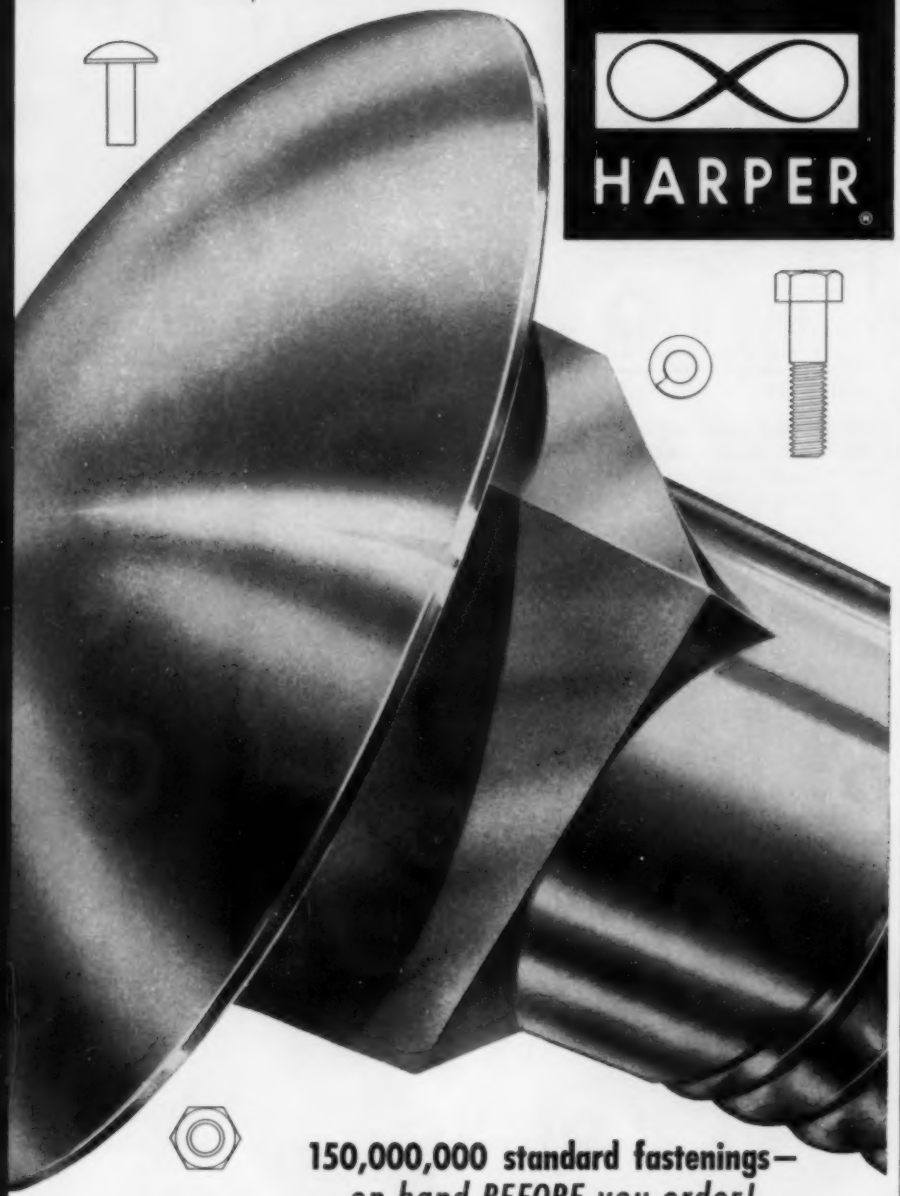


The shell process makes possible the casting of complex parts like this one. Originally considered for aluminum diecasting, the part is easily cast in gray iron. Tolerances of plus or minus 0.005 in. per inch are routine



The flexibility of shell casting offers the designers wide latitude. This drum for an automatic transmission must be free from sand inclusions because it operates in oil. And freedom from surface sand improves tool life

HARPER



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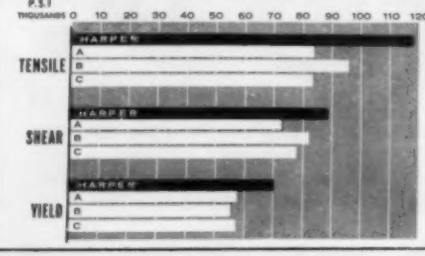


An important point in buying fastenings is strength. Independent laboratory tests*, utilizing Stainless Steel Machine Bolts by Harper and three other leading producers, prove Harper superiority in Tensile, Shear, and Yield Strength. The chart at left shows the actual results of these tests. For complete information on these important tests, request Form No. 126.

*By R. W. Hunt Laboratories

Easier To Machine

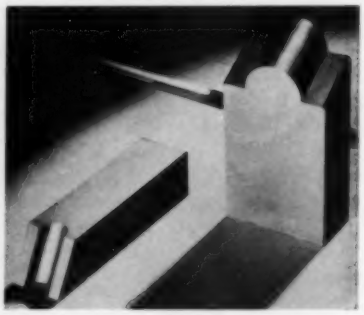
Tool steel uses sulphur, which is equivalent to 0.25-0.30 per cent graphite in machinability

A NEW tool steel, called Oilgraph-EZ, uses a small amount of sulphur and graphite to increase machinability and retain good finishing properties.

Graphite in steel makes it easier to machine, says Allegheny Ludlum Steel Corp., but when the graphite gets beyond about 0.50 per cent it damages the finish.

Combination — By adding 0.10 per cent sulphur to the tool steel which has a graphite range of 0.20 to 0.40 per cent, the two elements act as if the steel contained 0.50 to 0.70 per cent graphite.

The sulphur and graphite particles act as a continual lubricant during machining. The graphite particles are dispersed evenly through the steel and increase its resistance to wear and galling. The sulphur does not affect the other properties of the steel.



TOOLS
. . . made from Oilgraph-EZ tool steel

Uses—In test runs, Oilgraph-EZ gave excellent performance under production conditions when used as small drill jig bushings and carbon steel taps, says Allegheny Ludlum.

Other applications include gages, punches, dies for forming, blanking and trimming, shanks for carbide tools, machine spindles and other machine tool parts.

Typical analysis of the steel: Carbon (total) 1.45, manganese 0.80, silicon 1.15, chromium 0.20, molybdenum 0.25, sulphur 0.10, graphite 0.20 to 0.40.

Rolling Mill Meeting

Plans for AISE conference in Cincinnati include an off-the-record panel discussion

ROLLING MILLS will be the focus of interest at the spring conference of the Association of Iron & Steel Engineers in Cincinnati Apr. 29 through May 1. The program:

Monday, Apr. 29

Rolling Mill Session, 9 a.m.—Recent developments in slabbing mills; roll design for a combination wide flange beam and structural mill; mechanical manipulation in bar mills.

Electrical Session, 9 a.m.—Electrical drive system for a high speed combination rod mill; electrical equipment for a modern rod mill; strip thickness control on hot strip finishing mills.

Rolling Mill Session, 2 p.m.—American Steel & Wire's new rod mill; a combination mill for rolling strip, rods and bars; Algoma Steel Corp.'s combination bar and strip mill.

Combustion Session, 2 p.m.—Billet heating at Bethlehem Steel's new Johnstown rod mill; rapid heating in the soaking pits at Fairless Works; developments in metallic recuperators.

Tuesday, Apr. 30

Rolling Mill Session, 9 a.m.—Turn up and turn down in hot rolling; operating methods of the Steel Co. of Canada's hot strip mill; the planetary hot strip mill and its uses.

Mechanical Session, 9 a.m.—Spindle slipper lubrication; protection of primary roll neck bearings; crowned tooth gear-type couplings.

Panel Discussion, 2 p.m.—Guides on rod and merchant mills; cooling rod and merchant coils; roll changing ideas; polishing finishing passes in rod and merchant mills; cutting deformations for reinforced concrete lug bar.

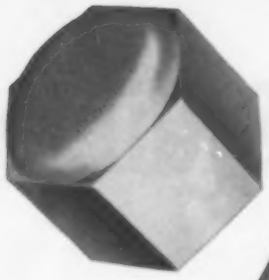
Dinner, 7 p.m.—Speaker, R. L. Gray, president, Armco Steel Corp.

Wednesday, May 1

Inspection Trip, 8:30 a.m.—All-day trip via special train to Portsmouth Division, Detroit Steel Corp., Portsmouth, O.

HARPER

CORROSION-RESISTANT FASTENINGS



Harper FLO-FORM Process
Saved money...made part better!

A manufacturer of an electrical hand tool was milling and slotting a copper conductivity pin from wire. The cost was too high—too many rejects. They called in the Harper Application Engineer who suggested redesign of the part for production by the Flo-Form Process. Now it is made at lower cost. There are no rejects. Grain structure is better. The part is stronger and more efficient. Your "special" problem can be solved by the Harper Flo-Form engineering team of designers, metallurgists, and tooling specialists with vast experience gained in over 33 years of solving fastenings problems. Save money. Send us your problem today or call your nearby Harper Branch for Harper Application Engineering Service.

Meet Harper Application Engineer, RICHARD FRODIN

Fastening users in the widespread Chicago manufacturing area are familiar with Harper Flo-Form Engineering Service given by Mr. Frodin. Dick has wide experience with plants large and small, and daily puts to work ideas and suggestions which solve special fastening problems of his customers.

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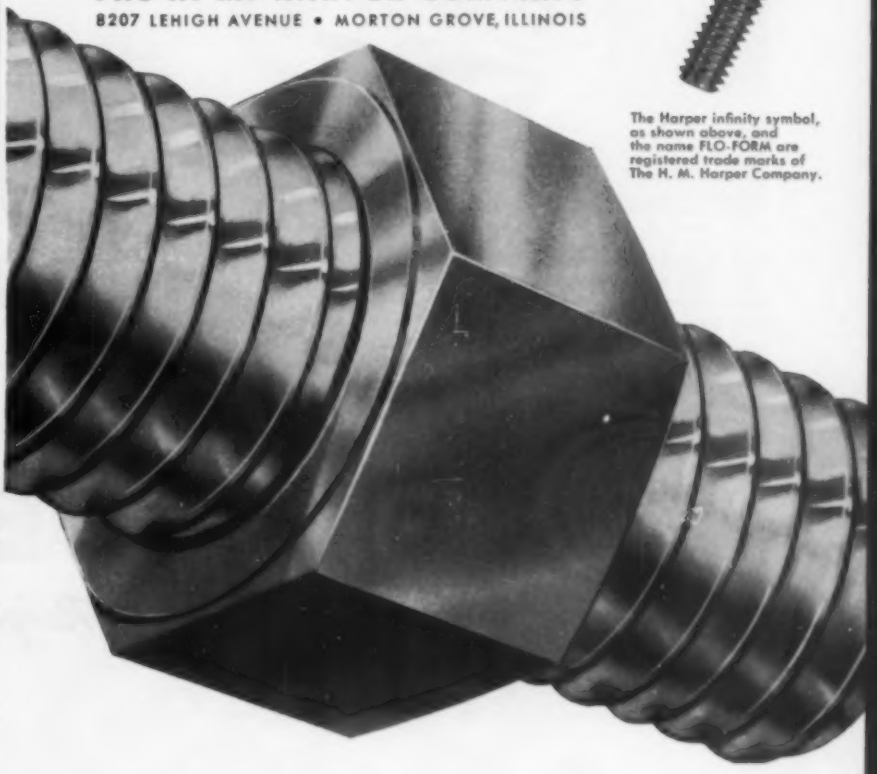

The Harper infinity symbol, as shown above, and the name FLO-FORM are registered trade marks of The H. M. Harper Company.

Stainless Steel Gives Your

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Product a Competitive Edge

LOOK AT YOUR PRODUCT from the woman's angle. Sales success depends upon her acceptance. She wants a product that will keep its good looks—that is easy to clean and keep clean—that resists rust and corrosion—that doesn't tarnish—that is tough and strong to resist denting and scratching.

Republic ENDURO® Stainless Steel gives your product all of these advantages—plus eye and buy appeal. ENDURO, used for brightwork or as a functional part of the product, is an unmistakable sign of top quality that women recognize and appreciate. A quality that gives your product a competitive edge.

NOW LOOK AT YOUR PRODUCT from the production angle. You and your suppliers can fabricate ENDURO Stainless Steel on your present equipment without difficulty or major change in procedure. And remember, ENDURO requires *no* lacquering, plating or electro-chemical treatments to enhance its famed corrosion resistance and lasting beauty. Republic Metallurgists will help you choose the proper ENDURO types to add sales stimulus to your product. Mail the coupon.

HIGH STYLE AND HARMONY. Manufacturers of many major appliance items are skillfully using the lustrous beauty of ENDURO to complement and harmonize with other materials and finishes. It enhances the over-all design, yet does not compete for attention.

SAFE FOR FOOD OR THE FINEST FABRICS. Thousands of commercial applications have proved ENDURO safe for processing food and dairy products, for dyeing, bleaching and laundering the finest fabrics. ENDURO's smooth, hard, dense surface offers little foothold for contaminants or bacteria. Corrosion is locked out. These advantages are being applied to an ever increasing number of appliances and housewares. What about your product?

EASY TO CLEAN and keep clean. ENDURO is easily cleaned with a simple soap and water rinse. There's no applied surface to chip, flake or peel away. Nothing to tarnish or fade. Republic also supplies two other outstanding steel sheet products. Republic Continuous Galvanized, used for liners, etc., offers excellent ductility and a tight zinc coating. Republic Electro Paintlok, for housings and other parts, can undergo severe forming operations before painting and still retain its superior paint-adhering quality. Send coupon for facts.

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Send more information on:
☐ ENDURO Stainless Steel ☐ Electro Paintlok® Sheets
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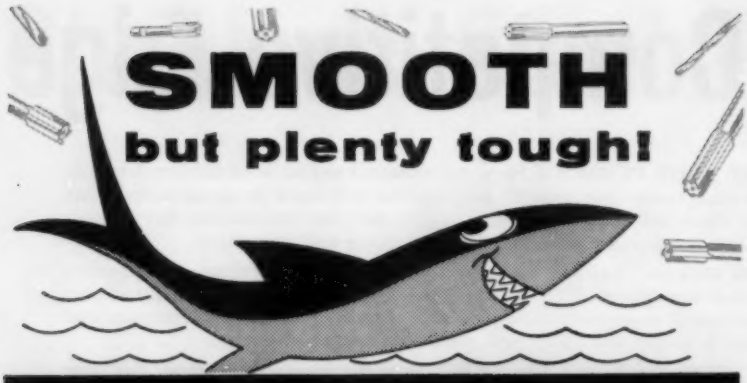
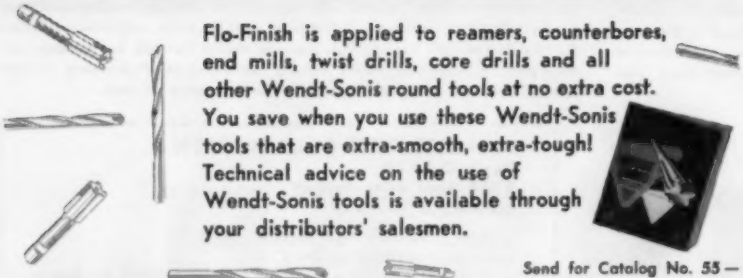


WENDT-SONIS tools cut
fast and clean . . . stay sharp

Flo-Finish, an extra process applied to Wendt-Sonis tools after grinding, improves smoothness 30% over ground finishes, permits faster feeds and speeds.

Micro-photograph (below) shows how Flo-Finish (left) eliminates grinding marks (right).

Flo-Finish makes stepped-up production possible because the smoother flutes on round tools permit faster chip flow away from the cutting edges. Tool life is doubled in some applications, because there is less chip friction, less heat.



Flo-Finish is applied to reamers, counterbores, end mills, twist drills, core drills and all other Wendt-Sonis round tools at no extra cost. You save when you use these Wendt-Sonis tools that are extra-smooth, extra-tough! Technical advice on the use of Wendt-Sonis tools is available through your distributors' salesmen.

Send for Catalog No. 55 — Address Dept. SM-457

WENDT-SONIS COMPANY

Hannibal, Missouri • Rogers, Arkansas

Design for Stamping

Winning contest entry may save Cleveland firm $25,000 a year; details given on other ideas

REDESIGN of a shower bath head so it could be manufactured by stamping won $500 for the director and superintendent of the tool, die and engineering department of a Cleveland firm. It may save his company as much as $25,000 a year.

The idea man, Ernest J. Urbas of the Guarantee Specialty Mfg. Co., received the 1957 John Woodman Higgins Redesign Award at the spring technical meeting of the Pressed Metal Institute. The award money is donated by the Worcester Pressed Steel Co., Worcester, Mass.

Design — Formerly, the shower bath head was made by combining a threaded brass tubing with a brass screw machine part. In the new design, the ball-shaped head is stamped on the end of the tubing in three press operations.

SHOWER BATH HEAD
. . . stamped in three operations

Leakage danger has been reduced, and the appearance of the head improved by the absence of threading on the tubing.

Runner-Up—Honorable mention in the nationwide competition went to R. V. Gillespie of the Duff-Norton Co., Pittsburgh, for the redesign of a spring frame assembly for rack jacks.

This frame exerts spring force on each of two jack pulleys, tending to push them against the rack when the jack is raised. A connecting link joins the spring frame assembly to the jack lever.

Savings—The spring frame body was changed from a cored casting to a flat stamped plate and the connecting link from a casting to a flat stamping. Other parts were

modified to fit into the new design.

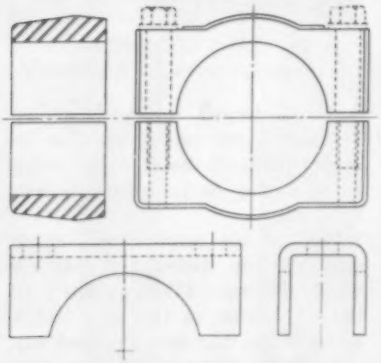
Two models of the assembly were redesigned. Cost of the lighter model dropped from 70.7 to 29.9 cents; the heavier one from 84.5 to 32.4 cents. Annual savings on the part (including overhead) were about $5000.

SPRING FRAME ASSEMBLY
. . . stampings replace two castings

Other entries for the redesign award included a motor mounting clamp, a balancing disc, a water softener tank closure and a pressure valve for a hydraulic brake system.

Mounting Clamp—This part was changed from a forging to two stampings. The forgings were 4 x 3½ x 1⅝-in. with a center hole 2⅝-in. in diameter and two holes drilled through on either end. Sawing the forging in two gave a clamp which holds the motor on a pipe thread machine, a sewer cleaner and a power vise stand.

The forging was replaced by two pieces of 3/16-in. stock which are blanked, pierced and formed. Two ⅜-16 weld nuts are welded to the bottom half. The new clamp also can be accurately welded to the case for motor alignment.



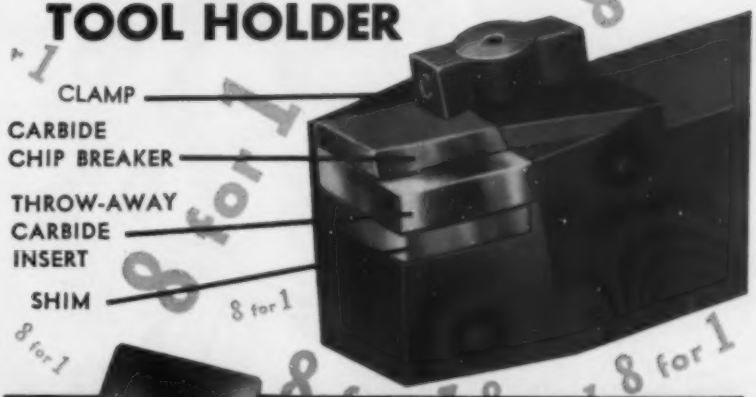
MOUNTING CLAMP
. . . stampings replace forged part

Cost went from $2.58 for the forged clamp to $0.468 for the stamping—a saving of $8000 a year.

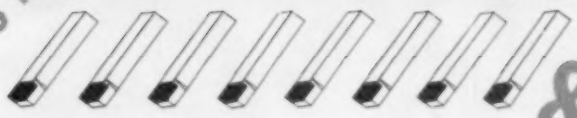
Disc—This formerly was a machined part. A heavy 4½-in. disc with a hole in the center and 16

8 for 1

THIS WENDT-SONIS TOOL HOLDER



• • • PLUS ONE INSERT GIVES YOU UP TO 8 CUTTING EDGES



SAVE ON INVENTORY With the wide range of Wendt-Sonis carbide grades and shapes available in throw-away inserts and chip breakers, one tool holder and a stock of inserts can do the work of a much larger stock of brazed single-point tools.

SAVE ON GRINDING With the much lower cost of throw-away inserts, expensive diamond-wheel regrinding is unnecessary.

SAVE ON MACHINE DOWN TIME Because precision-made Wendt-Sonis inserts can be indexed to ±.001", inserts can be replaced without removing tool holder from machine.

FREE TECHNICAL SERVICE in connection with your tooling problems is available from the Wendt-Sonis representative in your area. Ask him for detailed information on Wendt-Sonis tool holders and throw-away carbide inserts or write for Catalog 57-A. Address Department SM-457.

WENDT-SONIS COMPANY
Hannibal, Missouri • Rogers, Arkansas

what's in a name?

To these proud parents there's only one "Johnny"!

In the field of metal abrasives, there's only one "MALLEABRASIVE", and that's our baby!

"MALLEABRASIVE" is the name of the world's first malleablized abrasive, researched and developed by Globe and famous Battelle Memorial Institute.

No other metal abrasive is the same because only Globe uses the complete process which gives Malleabrasive its own distinctive metallurgical structure.

What's in a name? Just this — the name MALLEABRASIVE represents a standard of excellence that prompts Malleabrasive users to ask, "Is it as good as Malleabrasive?" when urged to buy something similar.

Sold by Pangborn Corporation, and by leading distributors of foundry supplies from coast to coast.

MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

1907—Fiftieth Anniversary—1957

DESIGN FOR STAMPING . . .

smaller holes around the periphery was assembled to a graduated armature spindle. Bolts and nuts were put into the peripheral holes to balance the motor. The disc could not be welded on the armature because of spatter dangers, and it showed a tendency to slip.

A stamper designed a part with extruded center hole to get an interference fit. The original cost of about $3 was replaced by a stamping cost of 19 cents. Savings were better than 93 per cent with an annual saving of about $3600.

Tank Closure — Former design called for a neck (sleeve), yoke and cover assembly with threaded stainless steel handle and compression gasket. This setup would eventually fail because the stainless handle would wear the brass cast thread of the yoke. The handle design made it subject to overtightening.

Redesign solved the problems. Instead of welding a neck in, the cover was pierced and the hole extruded. Two clips were spotwelded to the underside of the cover on either side of the extruded hole.

TANK CLOSURE
. . . redesign saves $7740 annually

A brass forged cap with an assembled quad ring gasket is inserted through the hole and twisted to a stop so its groove is held by clips.

Cost of the original was $8.14; cost of the redesigned part is $3.84. Savings: $7740 annually. Of the $3.84 cost in the new design, $2.92 is for the brass forged cap.

Pressure Valve — Because 1000 of these parts were being used weekly when the redesign was made, annual savings amounted to $71,000. Total unit cost went from $1.68 to 25 cents.

Originally, the unit was assembled by swaging. The new design called for spotwelding the retainer to the housing.

VICTOR TORCH with cutting tip of Anaconda Tellurium Copper, which has the resistance to heat and wear required to maintain uniform flame characteristics through a long life of service.

Tellurium Copper makes better cutting and welding tips

Two typical Victor torch tips of Anaconda Tellurium Copper-127 shown full size.

THE PROBLEM: Victor Equipment Company of San Francisco first used regular leaded copper rod in making tips for its line of cutting and welding torches. In some applications, however, the leaded copper did not stand up under high heat conditions.

THE SOLUTION: Victor tried Anaconda Tellurium Copper-127 Rod and found the answer. The Tellurium Copper had a much higher heat resistance. This meant long, trouble-free service for its precision-made cutting and welding torches in all types of applications. At the same time, the Tellurium Copper provided uniform machinability, especially important in drilling the deep holes prior to completion by swaging on mandrels.

FREE TECHNICAL SERVICE: No matter what your special problem may be, The American Brass Company can very likely furnish free-cutting copper and copper-alloy rod to meet the requirements of the product or the operation.

It is the function of the Technical Department of The American Brass Company to assist metal users in the selection of Anaconda Rod. This service is at your disposal without charge or obligation. Comprehensive data on composition and machinability of standard Anaconda Rod Alloys, together with specification references, weights and dimensions, are available in Publication B-3. For this booklet – or technical assistance – write: The American Brass Company, Waterbury 20, Conn.

ANACONDA® COPPER and COPPER ALLOYS

MADE BY THE AMERICAN BRASS COMPANY

Guide for Forging Stainless

Here are preheat and forging temperatures, soaking times and cooling methods for chromium-nickel, martensitic chromium and ferritic chromium steel forgings

By W. E. McFEE
Supervisor
Product Information Service
Armco Steel Corp.
Middletown, O.

Forging a stainless billet with a 12,000-lb hammer. The billet has been preheated to the proper temperature

STAINLESS must be heated longer than carbon steel to reach proper forging temperatures. The furnace can be the same as that used for carbon grades. Here are the chief requirements:

1. Close temperature control to bring the stainless forging back to initial forging temperature without overheating.

2. A good furnace atmosphere that will hold scaling to a minimum. Decarburization or carburization may accompany excessive scaling. A slightly oxidizing atmosphere is safest.

Slow Heat — Most chromium-nickel bars and small sections may be brought directly to forging temperature, but it is best to heat slowly to a specified preheating temperature (generally 200°F below forging temperature).

Soak thoroughly at this heat level, then raise the charge to forging temperature. Large blooms should also be soaked thoroughly at forging temperature.

Always charge chromium-nickel types 309, 310 and 314 into a preheated furnace below 1400°F. Other chromium-nickel types can be charged into a hot or cold furnace.

Temperatures—Heat the hardenable chromium types to the recommended preheating temperatures (see table on heating and cooling procedures). After proper

equalization, bring them directly to forging heat. A preheating range of 1400 to 1600°F is best for the higher carbon grades. A higher range can be used for types 403, 410, 416 (S) and 416 (Se).

Regardless of grade, large sections should be preheated and equalized at 1800°F. Do not charge heavy blooms into a furnace that is over 1400°F. Handle higher carbon grades in small sections the same way.

Ferritic Types — The ferritic chromium grades call for certain heating precautions. Elevated temperatures may decarburize them, cause rapid grain growth and loss of impact strength.

This cannot be remedied by annealing. Grain growth depends on temperature and exposure time. Do not exceed specified forging temperatures and hold soaking time to a minimum.

Precedure — Charge small sections into a hot or cold furnace and preheat to about 200°F below forging temperature. Allow minimum equalization time. Make the soaking period at forging temperature as short as possible.

Charge heavy blooms into furnace not over 1400°F, then bring slowly to a preheat temperature of 1800°F. Soaking times must be as short as possible, only to the point of temperature equalization.

Forging — Stainless steels are stronger and stiffer than ordinary forging steels at elevated temperatures. About one-fourth more hammer blows are needed to produce the same deformation.

Chromium-nickel steels also require more frequent heating for easy working (to restore plasticity) than do carbon or chromium steels.

Start blooms and heavy sections with light blows or passes. Large grains must first be broken into small refined grains. This generally is not necessary with small forging bars.

Cooling — Stainless steel parts should be cooled after forging (see table). During cooling, protect hot forgings from dirt, oil and grease. Don't put them on damp floors. To air cool uniformly, spread forgings separately; don't put them in piles.

1. Air Cool: Use air cooling for the chromium-nickel types. The nonhardenable chromium types, such as 403, should be cooled rapidly in air.

Forgings of types 403, 410, and 416 are air cooled off the hammer to attain full hardness, then tempered without further hardening treatments. If the forging is to be machined, it should be tempered to a Brinell hardness of 180 to 240.

2. Water Quench: Chromium-nickel forgings may be quenched in a water bath or water sprayed to speed handling.

3. Slow Cool: Use this method for the medium high carbon chromium types 420 and 420 F; also for large forgings in the lower carbon hardenable types such as 403, 410 and 416 (S and Se).

Immediately after forging, bury the material in dry lime, brick dust, mica or other good insulating powder and let cool to room temperature.

4. Furnace Cool (Practice A): Best practice is not to air cool the high carbon grades to room temperature. Examples are types

Heating and Cooling Data for Forging Stainless Steel Bars

(Solid sections of less than 6 in. minimum thickness)

Grade Name	Type	Furnace Charging Temp °F	Preheat[1] °F	Forging[2] Temp °F	Method of Cooling
Chromium-Nickel Types					
17-7, 18-8, 18-8 Si, 18-8 (low carbon), 18-8 ELC, 18-11 PS, 20-10	301, 302, 302B, 304, 304L, 305, 308	Not critical	1900-2000	2100-2200	Air cool or water quench
18-8 FM	303 (S)	Not critical	2000-2150	2200-2350	Air cool or water quench
18-8 FM	303 (Se)	Not critical	1900-2000	2100-2200	Air cool or water quench
25-12, 25-12 (low carbon), 25-20, 25-20 (low carbon), 25-20S	309, 309S, 310, 310S, 314	Below 1400	1400-1600	2100-2250	Air cool or water quench
18-12 Mo, 18-12 Mo ELC, 19-12	316, 316L, 317	Not critical	1800-2050	2000-2250	Air cool or water quench
18-10 Ti	321	Not critical	1900-2000	2100-2300	Air cool or water quench
18-10 Cb Ta	347	Not critical	1800-1900	2000-2100	Air cool or water quench
Martensitic Chromium Types					
12T, 12	403, 410	Not critical	1800-2000	2000-2200	Air cool, slow cool or furnace cool (Practice A)
12-2	414	Below 1400	1440-1600	2100-2200	Furnace cool (Practice B)
12 FM	416 (S)	Not critical	1900-2100	2100-2300	Air cool, slow cool, or furnace cool (Practice A)
12 FM	416 (Se)	Not critical	1800-2000	2000-2200	Air cool, slow cool, or furnace cool (Practice A)
13-C-35	420	Below 1400	1400-1600	2000-2200	Slow cool, or furnace cool (Practice A)
13-C-35 FM	420F (Se)	Below 1400	1400-1600	2100-2200	Slow cool, or furnace cool (Practice A)
16-2	431	Below 1400	1400-1600	2100-2300	Furnace cool (Practice B)
17-C-60, 17-C-80, 17-C-100, 17-C-100 FM	440 A, B, C, F	Below 1400	1400-1600	1900-2150	Furnace cool (Practice A)
Ferritic Chromium Types[3]					
12 Al	405	Not critical	1700-1850	1900-2050	Air cool
17	430	Not critical	1700-1800	1900-2000	Air cool
17 FM	430F	Not critical	1800-2000	2000-2200	Air cool
21	442	Not critical	1700-1800	1900-2000	Air cool
27	446	Not critical	1700-1800	1900-2000	Air cool

Notes:

(1) Soak at preheat temperature: All grades—minimum time for equalization.
(2) Soak at forging temperature: All grades—minimum time for equalization.
(3) Guard against soaking the ferritic-chromium types at high temperature to avoid decarburization and grain growth.

Heating and Cooling Data for Forging Stainless Steel Blooms

(Solid sections of more than 6 in. minimum thickness)

Grade Name	Type	Furnace Charging Temp °F	Preheat[1] °F	Forging[2] Temp °F	Method of Cooling
Chromium-Nickel Types					
17-7, 18-8, 18-8 Si, 18-8 (low carbon), 18-8 ELC, 18-11 FS, 20-10	301, 302, 302B, 304, 304L 305, 308	Not critical	2000	2300	Air cool or water quench
18-8 FM	303 (S)	Not critical	2000	2350	Air cool or water quench
18-8 FM	303 (Se)	Not critical	2000	2250	Air cool or water quench
25-12, 25-12 (low carbon), 25-20, 25-20 (low carbon), 25-20 Si	309, 309S, 310, 310S, 314	Below 1400	2100	2250	Air cool or water quench
18-12 Mo, 18-12 Mo ELC, 19-12	316, 316L, 317	Not critical	2000	2300	Air cool or water quench
18-10 Ti	321	Not critical	2200	2300	Air cool or water quench
18-10 Cb Ta	347	Not critical	2200	2250	Air cool or water quench
Martensitic Chromium Types					
12T, 12	403, 410	Below 1400	1800	2300	Slow cool or furnace cool (Practice A)
12-2	414	Below 1400	1800	2300	Furnace cool (Practice B)
12 FM	416 (S)	Below 1400	1800	2300	Slow cool or furnace cool (Practice A)
12 FM	416 (Se)	Below 1400	1800	2300	Slow cool or furnace cool (Practice A)
13-C-35	420	Below 1400	1800	2250	Slow cool or furnace cool (Practice A)
13-C 35 FM	420F (Se)	Below 1400	1800	2200	Slow cool or furnace cool (Practice A)
16-2	431	Below 1400	1800	2300	Furnace cool (Practice B)
17-C-60, 17-C-80, 17-C-100, 17-C-100 FM	440 A, B, C, F	Below 1400	1800	2150	Furnace cool (Practice A)
Ferritic Chromium Types					
12 Al	405	Below 1400	1800	2150 (3)	Air cool
17	430	Below 1400	1800	2050 (3)	Air cool
17 FM	430F	Below 1400	1800	2250 (3)	Air cool
21	442	Below 1400	1800	2050 (3)	Air cool
27	446	Below 1400	1800	2050 (3)	Air cool

Notes:

(1) Soak at preheat temperature: Chromium-nickel types—6 hours minimum
Martensitic chromium types—2 hours
Ferritic chromium types—2 hours

(2) Soak at forging temperature: Chromium-nickel types—4-6 hours
Martensitic chromium types—4-6 hours
Ferritic chromium types 405, 430 and 430F—2-4 hours
Types 442 and 446—1-3 hours

(3) Maximum temperature and soak to prevent decarburization and grain growth.

420 and 440. To prevent development of strain cracks, place the forging as it comes from the hammer into a furnace at 1300 to 1350°F. Let it soak for 3 to 6 hours; follow by air cooling to room temperature.

5. Furnace Cool (Practice B): Hardenability of types 414 and 431 is relatively high. Care must be taken in cooling. Isothermal annealing, suitable for high carbon grades, is not generally advisable. Long treatment periods of 50 to 100 hours at 1100 to 1200°F are necessary to fully soften.

A better method is to let the forging harden, and follow with an annealing treatment.

Internal Strains — Hardening starts at about 600°F and continues down nearly to room temperature. When hardening begins, the part expands. If the entire forging does not pass through this range at the same time, the sections at 600°F may be contracting while those at lower temperature are expanding. This could cause severe internal strains and cracking.

Forgings of types 414 and 431 of less than about 5 sq in. in cross section and with no abrupt changes in section can be brought through the hardening range uniformly by burying in lime or ashes right from the hammer.

Cool to 200°F or lower before transferring the forging to the annealing furnace. Test with a hand magnet to make sure the parts are strongly magnetic.

Larger Parts—Take larger forgings hot from the hammer and put them in a furnace at 600 to 700°F before they have cooled into the hardening range. This also applies to complicated forgings that have abrupt changes in section.

When the forging has reached uniform temperature, shut off the furnace and let the parts cool in the furnace to about 200°F or lower. Hardening will take place through the full section at the same time. Follow by an anneal.

For type 414, anneal at 1150 to 1300°F. For type 431, the temperature range is 1150 to 1225°F. Soak from 4 to 8 hours, then air cool. Do not water quench.

Forging Dies—Hot forging dies are subjected to heat, pressure, abrasion and shock. They can last no longer than their resistance to those conditions. Die life is much shorter than when forging carbon steels.

Die steels and diemaking practices are the same for both types of metals.

Heat treating after forging generally is done to develop best machining hardness, specified mechanical properties or maximum resistance to corrosion. For recommended heat treatment procedures after forging see "Heat Treating Stainless Steels," STEEL, Aug. 8 and Aug. 15, 1955.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Unit saves 2¼ man hours on each shaft machined from

OSTUCO TUBING

VERTICAL TRACTION SHAFT

Unit Crane & Shovel Corporation, Milwaukee, "lowered the boom" on costs by using OSTUCO tubing for vertical traction shafts in its line of heavy construction equipment. By eliminating a center-boring operation, Unit *saved 2¼ hours machining time on each shaft.*

OSTUCO tubing has tremendous strength to absorb the constant shock and strain to which Unit equipment is normally subjected and machines easily to precision tolerances.

Cash in on the economy of OSTUCO'S unique "Single-Source-Service"—complete tubing facilities "under one roof"—by contacting your nearest OSTUCO sales office.

OSTUCO TUBING

SEAMLESS AND ELECTRIC-RESISTANCE WELDED STEEL TUBING—Fabricating and Forging

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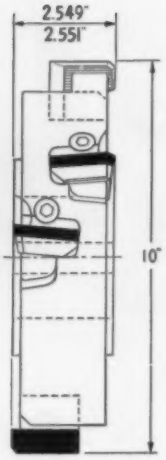
CANADA, RAILWAY & POWER ENGR. CORP., LTD.

EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
225 Broadway, New York 7, New York

Ingersoll inserted blade staggered tooth channeling cutter—2900X series, page 48, catalog 68

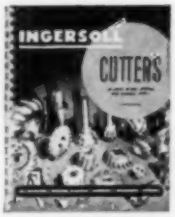


INGERSOLL CUTTER removes 2700 cu. in. of 1045 steel without resharpening at The Bullard Company

This ten inch, inserted blade, staggered tooth channeling cutter used by The Bullard Company, manufacturers of machine tools in Bridgeport, Connecticut, demonstrates long tool life of Ingersoll cutters on tough jobs. The cuts are 2½" wide. 1⅛" deep at a cutting feed rate of 6" per minute. The parts to be cut are 67⅝" long tool slides for the Bullard "Cut-Master" turret lathe.

The advantages of long life and dollar savings made possible by Ingersoll inserted blade cutters are being realized on all makes of machines, milling and boring a wide range of materials. An Ingersoll Cutter Division representative will be glad to discuss this and other long-tool-life experiences with you.

Whether you are concerned with tool life, feed rates, cutter costs or finish, the new Ingersoll cutter catalog will be a valuable guide. Write for your copy today, address Dept. 66V.



Use this new 82 page guide for selecting the right inserted blade milling and boring cutters for your work. Write for catalog #66, today.

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WESTINGHOUSE ELECTRIC CORP.

CUTTER DIVISION

THE INGERSOLL MILLING MACHINE COMPANY

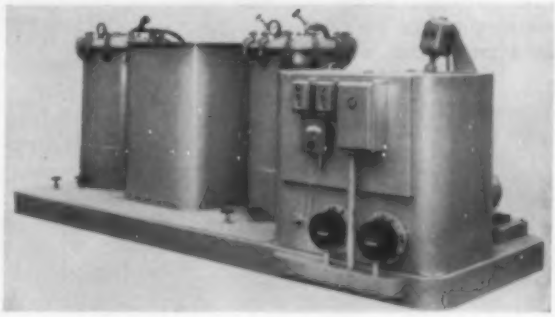
ROCKFORD ILLINOIS

Casting Impregnator Seals Microporosity

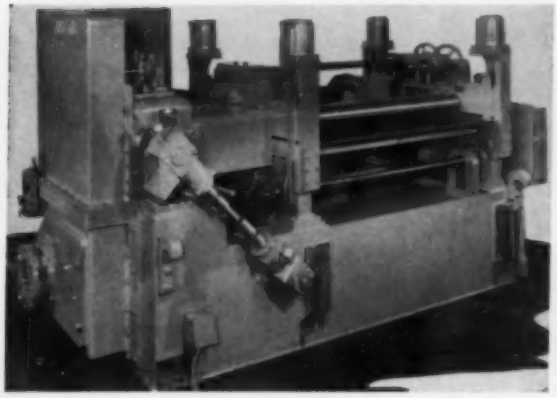
The vacuum pump of this impregnator can produce 29 in. of mercury vacuum in 4 minutes. The low-pressure unit can easily reach 29.9 in. of mercury.

A vented overflow system insures the replacement of rinse water. Only two water connections and one drain connection are needed.

The impregnator covers a 4 x 12 ft area. It operates on 115, 230, 450 or 560 volts, alternating current or direct current. A trough on the platform makes it easy to reach the unit's wiring. *Write*: Imprex Division, Ideal Industries Inc., 2023 S. 60th St., Milwaukee 19, Wis. *Phone*: Spring 4-5150



Automatic Press Feeder Handles Stock ⅛-In. Thick



This mechanically controlled line will feed 60-in. lengths of stock which are 60 in. wide.

It is composed of a coil holder, a decoiling unit, the feeder and a scrap shear (if there is a scrap skeleton to be disposed of). The line is electrically synchronized with the press and can be applied to progressive die operation or straight blanking work without modification.

A built-in roll release and antibackup rolls are provided for progressive die stamping.

Strip flatness is controlled by adjusting the built-in roller leveler. A slight up-curl can be rolled in to prevent the stock from hanging up in the dies. *Write*: McKay Machine Co., Youngstown 1, O. *Phone*: Riverside 6-6521

Right-Angle Gearmotors Save Space

Two types of gearmotors are offered: 1 to 10 hp for continuous-duty applications; 1 to 30 hp for intermittent uses.

The one-piece reducer housing is heavily finned for maximum strength and thermal properties. It contains a pair of helical gears for the primary reduction and a patented double-enveloping worm gear set for the secondary reduction.

Wormshaft and gearwheel teeth are concaved to give a constant double-throated contact over a 45-degree sector of the gearwheel. This makes it possible to use small gears and saves space and weight.

The units can be supplied with an alternating or direct current motor of any speed or rating and any standard type of enclosure. *Write*: Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, O. *Phone*: Redwood 2-7000

NEW PRODUCTS and equipment

Thickness Tester

The Demitron D-2 is a portable, nondestructive tester of coating thickness.

It provides direct readings of metal coatings (such as plating) on a metal base, nonmetallic coatings on a metal base and metal films on nonmetallic bases.

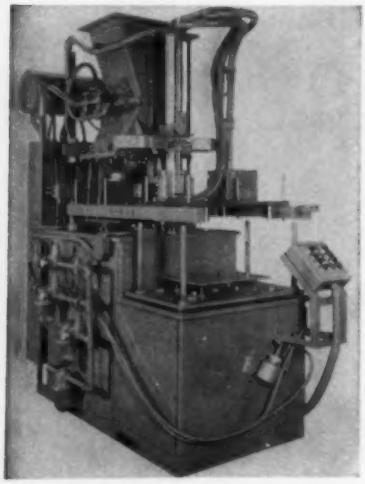
The machine can also be used to sort and match metals and alloys. *Write*: Unit Process Assemblies Inc., 61 E. Fourth St., New York, N. Y. *Phone*: Spring 7-1398

Machine Blows Shells

Blo-Core H1-1622 produces shell cores or shell molds automatically. Production rates go up to 120 blows an hour.

Hollow cores, solid cores, contoured shell molds or liner cores can be made. Shell cores up to 15 x 20 in. and 30 in. in height and molds up to 16 x 22 in. with a 15-in. draw can be made.

The two-station machine has vertical or horizontal parting fixtures for handling hot coreboxes.



Heated mandrels are used to make hollow cores. *Write*: C & S Products Co. Inc., 18656 Fitzpatrick Ave., Detroit 28, Mich. *Phone*: Broadway 3-1230

Foundry Shakeout

This shakeout is for brass, bronze and aluminum castings. It handles molds which are up to 30 in. square and weigh up to 500 lb. The shakeout can also be used for small gray iron and steel molds.

Flasks can be cleaned in 2 to 4 seconds. A ½-hp motor with a direct drive coupling powers the unit. *Write*: Hewitt-Robins Inc., Stamford, Conn. *Phone*: Davis 4-1151

Ovens Are Accurate

Turbo-Convection ovens are used for the tempering, normalizing and drawing of ferrous and nonferrous metals, mold drying, paint baking and many other operations.

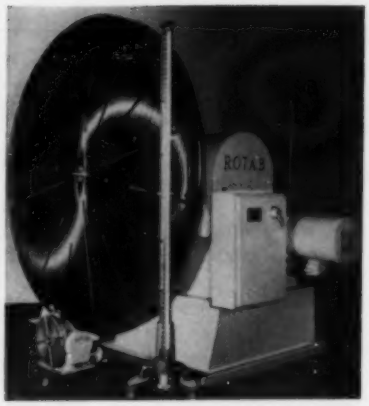
Heating chamber gradients are ±3°F. There are six standard models. Top temperatures range from 225 to 1000°F. Heating chambers range from 4¾ to 27 cu ft. *Write*: L & L Mfg. Co., 136 Eighth St., Upland, Delaware County, Pa. *Phone*: Chester 2-5164

Rotary Table

The 5 second accuracy of this 84-in. tiltable table increases the accuracy and efficiency of layout, inspection and quality control operations.

Optical measuring systems, sine bars and gage blocks are used to obtain precise radial and angular settings.

A portable pendant control box controls positioning in any one of three dimensional planes.



Locking quadrants on each side of the spindle assembly housing hold the table in any desired position. *Write*: Machine Products Corp., 6771 E. McNichols, Detroit, Mich. *Phone*: Twinbrook 1-4154

Flooring Compound

A ¼-in. layer of Sternite over concrete forms a hard surface that eliminates wheel drag. It does not depress under wheels. It withstands loads of 3000 psi after 48 hours of drying.

The material is dark brown and is supplied in 250-lb units ready for mixing. *Write*: Monroe Co. Inc., 10703 Quebec Ave., Cleveland 6, O. *Phone*: Sweetbriar 1-9555

Ultrasonic Cleaning

Seven models remove buffing and polishing compounds, honing and abrasive materials, machining chips and nonsoluble deposits.

The machines transfer high peak levels of ultrasonic energy to the cleaning chamber through transducers.

The frame mounted transducers are positioned to develop maximum

IMPORTANT: For your convenience this sheet is perforated. Tear it out and "buck-slip" it to the proper man in your plant.

Billet Grinding Wheels are typical of Carborundum's engineering "know-how" that gives you the finest abrasive products made. The technical report on the back of the page gives complete information about this operation.

Ask the man from **CARBORUNDUM** REGISTERED TRADE MARK **BONDED ABRASIVES DIVISION**

Also makers of a complete line of Coated Abrasives and Abrasive Grain

ATTENTION CONDITIONING-ROOM SUPERINTENDENT: Turn the page and study the Product Performance Report written especially for you.

Product Performance Report

GRINDING TITANIUM BILLETS

Operation

Condition 4 x 4 square titanium billets before rolling.

Project

1. Obtain lowest cost per pound metal removal.
2. Obtain most desirable surface finish.

Material for Test

1. Select quantity of billets that are of uniform standard size.
2. Use billets of one grade of titanium and one heat number.

Method

1. Swing grind with 20 x 2½ x 6 Resinoid bonded abrasive wheels.
2. Weigh material before and after grinding.
3. Obtain contact time wheel to metal.

Results

Average wheel Life/hrs.	Average Lbs. metal Removed per wheel	Average cost per Lb. Metal removed
12	68	$.115

Note

Carborundum, leader in abrasive techniques, backs up its products with trained sales representatives, a staff of competent field engineers and an abrasive engineering laboratory... all available to you to put more sense in your abrasive dollar.

Here is another in the series of Product Performance Reports being released by the Bonded Abrasives Division of The Carborundum Company. A color photograph of this actual operation is shown on the back of this page.

• *Ask your local distributor... or the man from*

CARBORUNDUM

REGISTERED TRADE MARK

effectiveness and are matched to the output of the ultrasonic generator. The machines eliminate hand scavenging and wiping of blind holes and inaccessible recesses.

A baffled water cooled jacket maintains a temperature of 140°F in the ultrasonic chamber. *Write*: Circo Equipment Co., 51 Terminal Ave., Clark (Rahway), N. J. *Phone*: Fulton 8-8600

Milling Machine

Model VM has five interchangeable spindle speeds—from 390 to 5200 rpm. The working surface of the table is 5 x 20 in. Longitudinal feed is 12 in.

The miller has an all-angle vertical head, a ground table surface, ½-in. tee slots and a heavy gage storage cabinet. *Write*: Rotex Punch Co. Inc., 2350 Alvarado St., San Leandro, Calif. *Phone*: Lockhaven 9-8180

Welding Machine

Truck driveshafts, tubes up to 6 ft long are welded by this machine. Only minor adjustments are needed

Here's another new device for the designer

THE FLEX'ATOR® COMPRESSION SPRING

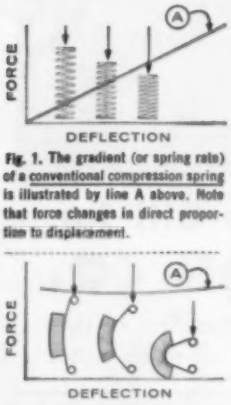


Fig. 1. The gradient (or spring rate) of a conventional compression spring is illustrated by line A above. Note that force changes in direct proportion to displacement.

Fig. 2. The unusual force pattern of a FLEX'ATOR Compression Spring is illustrated by line A above. Note that there is a very slight change in force over the entire stroke.

The new Hunter FLEX'ATOR Spring exerts virtually constant force throughout its compression stroke—is another new "one-force" mechanical loading device for product designers.

The patented FLEX'ATOR is a close-wound spring body (with pre-calculated initial tension) which has equal arms extended at an angle to the body. Loops or other arrangements are provided on the arm ends for fastening.

This new spring element exerts force as it is *flexed* rather than stretched or squeezed. In addition to close-to-constant force in compression, the FLEX'ATOR can be designed to provide increasing and decreasing force deflection characteristics as well—making this new component ideal for a host of critical applications.

To learn more about this new design element, request Bulletin 313A which describes it and includes preliminary design data. Also, if you write *direct to us*, we will gladly send you a *sample* FLEX'ATOR for your own first-hand examination.

THE HUNTER flex'ator compression spring

HUNTER SPRING COMPANY

19 Spring Avenue, Lansdale, Pennsylvania

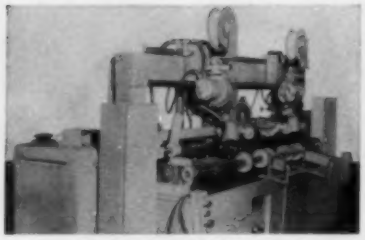
SPRINGS • STAMPINGS • TEST APPARATUS

NEW PRODUCTS and equipment

to accomplish changes in sizes.

The machine joins a universal joint assembly to a drive tube with a continuous weld bead around the diameter as the driving splined shaft is welded into the drive tube.

The arc is energized by direct current supplied to the heads by dual rectifier sets. Bare welding rod is fed automatically, and the arc is surrounded by CO_2 gas.



Rated output: 190 tubes an hour at 80 per cent efficiency. *Write*: Dix Engineering Co. Inc., 1415 Dix Rd., Lincoln Park 25, Mich. *Phone*: Dunkirk 1-8822

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CONTINENTAL CAN CO.

This 10-ton cab-operated *Cranemaster* is the first of two in service for Continental Can Co. Like so many other manufacturers, Continental Can Co. found Cranemasters *the top initial value* . . . with lasting satisfaction assured by Abell-Howe's years of experience in building overhead handling equipment that better *fills the bill* for industry of all kinds.

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CRANEMASTERS
FOR BETTER CONTROL OF COSTS!

First, you save on Abell-Howe low engineering and production costs! Then you save on operating costs because of *Cranemaster* speed and dependability... and the precise control you need for the most demanding lifting-loading jobs.

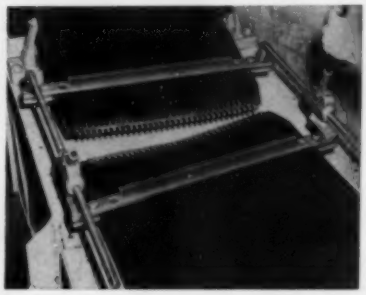
Send For Bulletin C-110

7747 Van Buren Street **ABELL-HOWE COMPANY** Forest Park, Illinois

Clamp Installs Belts

One man can install conveyor belts quickly with the Far-Pul and a wrench.

Each end of the belt is clamped between bars, one set of which is equipped with jacks and tensioning rods. Tensioning rods are slipped over studs on the bar



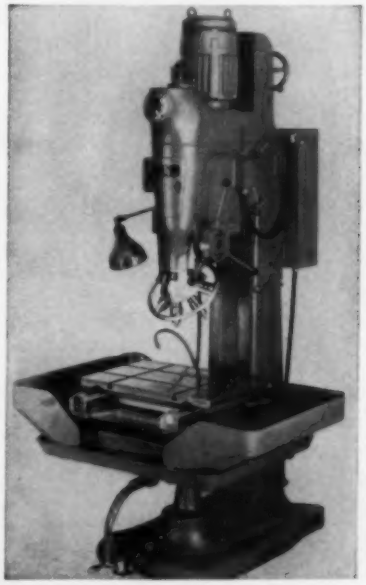
clamp, and the ends of the belt are drawn together by the jacks.

When the fasteners mesh properly, a pin is inserted through loops of lacing or fasteners. *Write*: Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill. *Phone*: Mansfield 6-1028

Positioning Table

This universal table can reproduce any pattern of holes within a 10½ x 12 in. rectangle. It can be used with turret drilling and tapping machines, single spindle drill presses and radial drills.

The table can be changed from



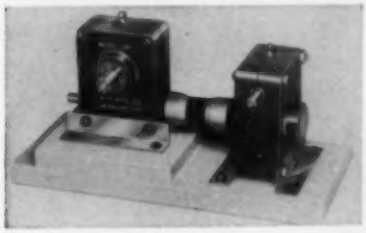
one job to another in about 15 minutes by changing the hole location plate. *Write*: Howe & Fant Inc., East Norwalk, Conn. *Phone*: Temple 8-5561

Speed Reducer

You can get 19 speed reduction ratios for fractional motors from five models of reducers.

The reducers with ratios of 15:1, 20:1, 30:1, 48:1 and 60:1 can be paired in 14 combinations to produce additional ratios — 225:1, 300:1, 400:1, 450:1, 600:1, 720:1, 900:1, 960:1, 1200:1, 1440:1, 1800:1, 2304:1, 2880:1 and 3600:1.

The unit combines a molded



nylon gear with a machined steel worm. Bearings are of sintered bronze. *Write*: Rampe Mfg. Co., 14915 Woodworth Ave., Cleveland 10, 0. *Phone*: Mulberry 1-2800

Contact Adhesive

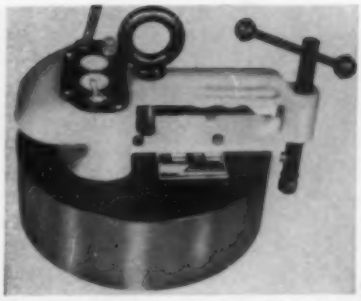
Hybond 56 is a fast-setting synthetic rubber compound for high speed industrial bonding operations. It is suitable for most types of dissimilar lamination involving steel, aluminum, plastic laminates, fiber boards, leathers, wood, fabric, rubber and honeycombs.

The compound sprays easily and develops strength quickly. It has a high dead load strength, yet is elastic enough to resist shock and fatigue. *Write*: Technical Service Department, Pierce & Stevens Chemical Corp., Buffalo 3, N. Y. *Phone*: Mohawk 4910

Magnetic Plate Clamp

The Model PH Mag-Tool holds heavy metal plates in alignment for welding without auxiliary equipment.

The clamp exerts up to 8500 lb of magnetic power, weighs only 85 lb and operates on 65 watts.



Write: Magnetic Tool Corp., 1955 Layfette St., Santa Clara, Calif. *Phone*: Cherry 3-7388

Lapping Machines

Production quantities of parts with surface finishes of 0.09 microinch and dimensions accurate to 1 millionth of an inch can be made by this parallel lapping machine.

Variable drives provide speeds of 10 to 50 rpm (in both directions) of either the lower lap or the workholder. The speed is shown on a tachometer in the machine's column.

Capacity: Flatwork, 5 x 5 x 5

Charlie says – "Come as you are!"

They have everything we need in WESTern PENNsylvania

- *100% Financing* of industrial plant space through Community-State Program
- *2% Minimum Interest* on half your plant cost for 25 years (max. terms)
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Charles M. Fife, Mgr., Area Development Dept. S-3
West Penn Power Company
Cabin Hill, Greensburg, Pa.

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an operating unit of the WEST PENN ELECTRIC SYSTEM

BRUTE STRENGTH FOR BIG ASSEMBLIES—

Cleveland large diameter upset forged socket head cap screws

On big presses, extrusion machinery, and earth moving equipment, fasteners not only have to support massive static loads; they must also withstand the dynamic stress of heavy impact, shock and vibration.

Engineered specifically for this type of service, Cleveland large diameter socket head cap screws are upset forged from specially heat-treated alloy steel. The forging process shapes the steel so that grain flow follows the contour of the head; eliminates planes of weakness along which shear might occur under dynamic stress; and protects assemblies against fastener fatigue failure.

In large diameters we regularly stock 1¼-7 and 1½-6 through 12 in. for same-day shipment. For other standard sizes from 1⅛ to 3 in. diameter through 12 in. length, we have the stock and the tooling to produce your order quickly.* For prompt service, contact your local Cleveland distributor. He can also supply large diameter upset forged hexagon head cap screws.

*Diameters over 3 in., lengths over 12 in., available on special order.

New folder gives dimensions (including old and new head details), physical properties, weights, prices of Cleveland large diameter socket head cap screws. Write for copy today.

THE CLEVELAND CAP SCREW COMPANY

4444-2 Lee Road, Cleveland 28, Ohio

WAREHOUSES: Chicago • Philadelphia • New York • Providence • Los Angeles

NEW PRODUCTS and equipment

in.; cylinders, 5 in. in diameter x 5 in. long. *Write*: DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. *Phone*: Vanderbilt 4-1122

Resistance Welder

Stranded copper lead wire is joined to magnesium-encased batteries by this automatic machine. Production rate: 3600 an hour.

Both components are fed automatically—the wire from a spool and the batteries from a loading chute. *Write*: Taylor - Winfield Corp., Warren, O. *Phone*: 2252-1

Double-Column Miller

Heads for milling, drilling, grinding or boring can be mounted on this hydraulic machine.

The double-column mount provides table rigidity. The knee, which has 15 in. of vertical travel, is centered above the vertical screw.

Maximum table stroke is 30 in. *Write*: *U.S.* Burke Machine Tool

Rocker Dumps

RD CARS to any capacity for any track gauge for manual or locomotive hauling. Custom-built.

IT PAYS to insist on EASTON quality when you buy rocker dump cars or trailers. You pay less in the long run. EASTON cars are built to stand up through more years of dependable heavy service.

RD TRAILERS of all types for handling loose bulk materials of any kind.

OUR 43RD YEAR

A-1060

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

NATIONAL SUPPLIER FOR 54 YEARS

Punches, Dies, Rivet Sets, "Heatproof" Compression Dies.

Round, square, oblong Punches and Dies—Rivet Sets carried in stock.

Write Dept. A for catalog 54 and new stock list.

GEO. F. MARCHANT COMPANY

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Illustrating the smallest and the largest Apex impact sockets proves only that you can get an Apex socket to run any size of hex nuts you may be using on your production or maintenance work.

These extremes of socket size do not show the precision machining of the high carbon electric furnace alloy steel used in Apex sockets. Nor do they show the cold broaching and carefully controlled heat treating that enables Apex sockets to withstand the severe shocks and strains of heavy-duty service.

But you can easily prove that Apex impact sockets will outperform and outlast ordinary sockets. Just try Apex impact sockets on your work—you'll soon see that freedom from quick wear-out and breakage will help boost productive output per tool and, at the same time, help lower your tool costs.

Catalog 29-R lists over 5,000 types and sizes of Apex Nut Running Tools; write, on your company letterhead please, for your copy.

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Send sketch or blueprint, we'll quote promptly

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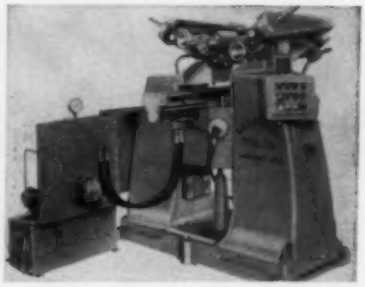
MEMPHIS • MILWAUKEE • MINNEAPOLIS • NEW ORLEANS • NEW YORK CITY • OAKLAND
PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • ST. LOUIS • SEATTLE
SHREVEPORT • SOUTH BEND • SYRACUSE • WICHITA

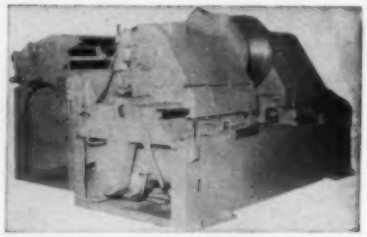
NEW PRODUCTS and equipment



Division, Cincinnati Mfg. Corp., Brotherton Road & Pennsylvania Railroad, Cincinnati 27, O. *Phone*: Bramble 5000

Coil Straightener

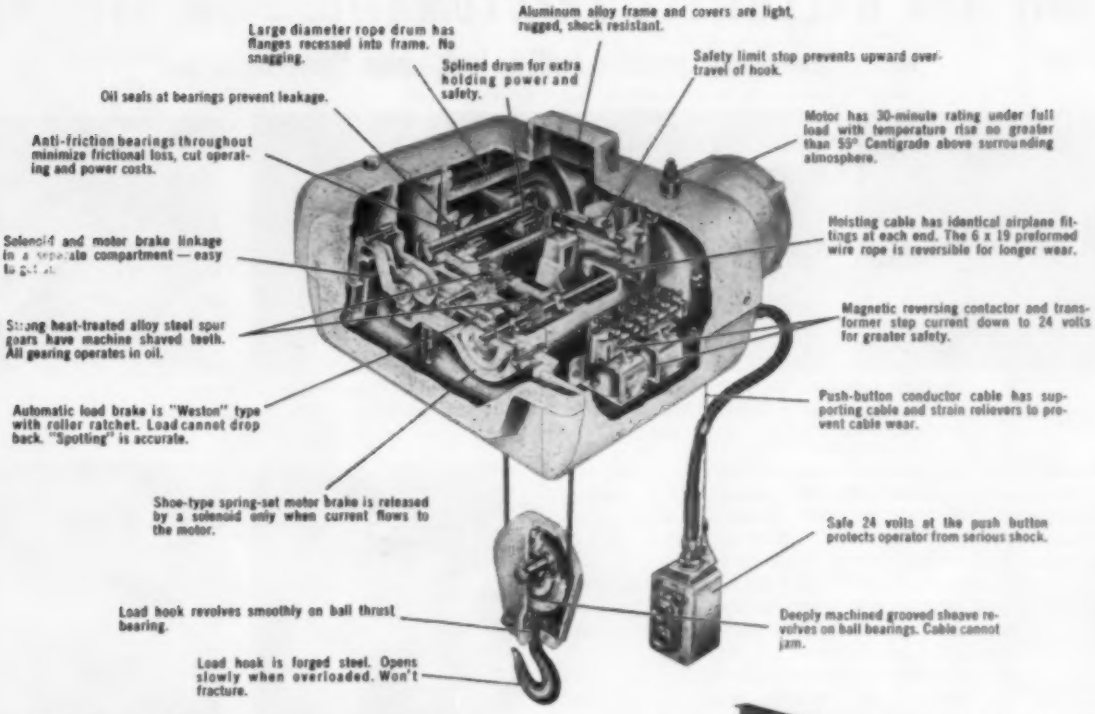
This cone-type cradle and straightener can handle coils 10 to 60 in. wide. Coils can be 66 in. OD.



The straightener has five rolls and two sets of pinch rolls. *Write*: Automatic Feed Co., P.O. Box 391, Napoleon, O. *Phone*: 6951.

Press Has Deep Throat

Model 4G is a 40-ton Rousselle unit that will punch or blank large sheets as well as handle a variety


Aluminum alloy frame and covers are light, rugged, shock resistant.
Large diameter rope drum has flanges recessed into frame. No snagging.
Splined drum for extra holding power and safety.
Safety limit stop prevents upward over-travel of hook.
Oil seals at bearings prevent leakage.
Motor has 30-minute rating under full load with temperature rise no greater than 55° Centigrade above surrounding atmosphere.
Anti-friction bearings throughout minimize frictional loss, cut operating and power costs.
Hoisting cable has identical airplane fittings at each end. The 6 x 19 preformed wire rope is reversible for longer wear.
Solenoid and motor brake linkage in a separate compartment — easy to get at.
Magnetic reversing contactor and transformer step current down to 24 volts for greater safety.
Strong heat-treated alloy steel spur gears have machine shaved teeth. All gearing operates in oil.
Push-button conductor cable has supporting cable and strain relievers to prevent cable wear.
Automatic load brake is "Weston" type with roller ratchet. Load cannot drop back. "Spotting" is accurate.
Shoe-type spring-set motor brake is released by a solenoid only when current flows to the motor.
Safe 24 volts at the push button protects operator from serious shock.
Load hook revolves smoothly on ball thrust bearing.
Deeply machined grooved sheave revolves on ball bearings. Cable cannot jam.
Load hook is forged steel. Opens slowly when overloaded. Won't fracture.

TOP QUALITY SPELLS TOP PERFORMANCE FOR YOU

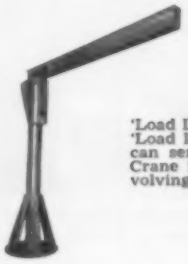
This is the Series "600" 'Load Lifter', the tough wire rope electric hoist with a well-earned reputation for speeding production. The ½-ton size lifts at 30 FPM at the push of a button. Only 24 volts at the push button means a big plus in safety.

The "600" has few functional parts and has anti-friction bearings throughout. That means less wear and lower power and operating costs — economy! Strong construction is combined with lightness for stamina and easy movement on the I-beam. Your service man won't see much of this hoist, yet every part is easily accessible by removing covers *while the hoist is in the air!*

Check the construction of the Series "600" 'Load Lifter'. Compare its quality, performance and low headroom with other makes. You will be convinced that here is the best value in its class. ½ and 1-ton capacities available in lug or hook suspension or with plain or motor-driven trolley. *Your "Shaw-Box" Distributor will gladly give you full details — or write us for Bulletin 408.*

Series "600" 'Load Lifter' with push-type trolley equipped with ball-bearing wheels for smooth, easy travel even on curves. Trolley adjustable to fit various I-beam sizes.

Series "600" 'Load Lifter' with motor-driven trolley that travels at 100 FPM — saves time and energy — smooths out production flow. Trolley available separately for "600" hoists already in service.



'Load Lifter' Jib Cranes. A "600" 'Load Lifter' Hoist on this crane can serve a 550 sq. ft. area. Crane is self-supported, full revolving. Capacities to 5 tons.

57 F-2

'Load Lifter'® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
SHAW-BOX CRANE & HOIST DIVISION
384 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.

Only New HALLOWELL *ERECTOMATIC.* Steel Shelving

has a time-saving, positive built-in lock—plus these features:

FAST ASSEMBLY. Just position the shelf supports, insert the shelf, press the locks. Straight-in, straight-out shelf change. No tilting. No dismantling. No interference with any other shelf.

New Hallowell ERECTOMATIC® steel shelving goes up fast, can be rearranged in seconds. It's the unique built-in locking device* that cuts assembly time, speeds repositioning of shelves. Here's how easy it is! To position a shelf—slide it into place on the shelf supports, press the locks, and the job is done. To reposition a shelf—release the locks, pull the shelf straight out, slide it straight in on the supports at its new location, and press the locks. It takes only seconds to complete the move.

New Hallowell ERECTOMATIC steel shelving is available in all types, too. Open, closed, bin units, ledge units, counter units, and cabinets are made of prime steel, phosphate coated, and finished in baked-on enamel. Standard is SPS green, other colors are available.

Investigate new Hallowell ERECTOMATIC before ordering shelving. You'll find it stocked by leading industrial distributors and shop equipment dealers everywhere. Contact the one nearest you. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

*Patent applied for

SEE US AT THE MATERIALS HANDLING EXPOSITION IN PHILADELPHIA, CONVENTION HALL—APRIL 29–MAY 3. WE'LL BE AT BOOTH 1147.

QUICK SHELF CHANGE. Release the locks, remove the shelf and its supports, relocate, and press the locks.

HALLOWELL® SHOP EQUIPMENT DIVISION

STANDARD PRESSED STEEL CO.

SPS

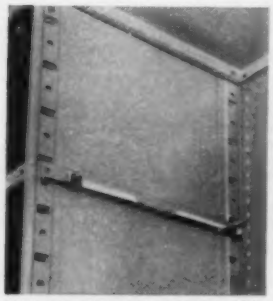
JENKINTOWN PENNSYLVANIA

INDEPENDENT SHELF POSITIONING. Each shelf can be individually repositioned in seconds.

FULL USE OF SHELF AREA. No tees or angles, and beaded posts save valuable space.

COMMON SIDE PANELS AND POSTS save material between adjacent units in rack. Back and side panels are one-piece.

BEADED POSTS AND FLANGED SHELVES prevent snagging of clothing or stored goods, protect workers.



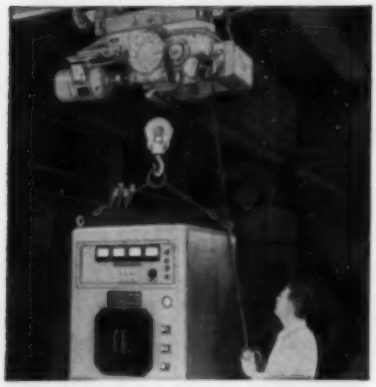
FULL DEPTH SHELF SUPPORT. No buckling possible. Reinforcements can be added when they are required.

4 CLASSES OF SHELVES. Regular, medium, heavy and extra-heavy construction meets all load requirements.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.



Push a button for higher production with

READING ELECTRIC HOISTS

● Ohio Crankshaft's Tocco Division plant is meeting higher production goals with help from Reading Electric Hoists. The new plant was designed with a Reading Hoist "custom-built" into the plans. Write for our latest bulletin "The Why and How of Faster Production".

READING CRANE & HOIST CORP.

CHAIN HOISTS • OVERHEAD TRAVELING CRANES • ELECTRIC HOISTS

2102 ADAMS ST., READING, PA.

NEW PRODUCTS and equipment

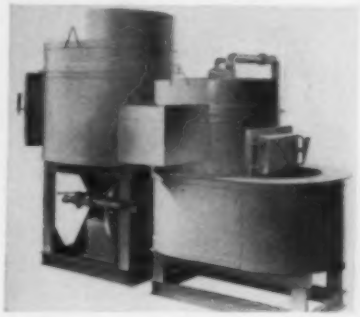
of regular operations in the plant.

Throat depth from ram center to frame is 24 in. Sheets can be up to 48 in. wide. *Write*: Service Machine Co., 2310 W. 78th St., Chicago 20, Ill. *Phone*: Prospect 8-1200

Aluminum Furnaces

These double chamber furnaces incorporate separate units, one for melting and the other for holding.

Melting rates are 450 to 1600 lb an hour. Holding capacities are 680 to 2450 lb.



Relining time is reduced because the furnace roofs are removable. *Write*: Stroman Furnace & Engineering Co., Franklin Park, Ill. *Phone*: Gladstone 5-2412

Spindles Remove Bolts

The 10403-R, a ten-spindle bolt remover, removes the main bearing bolts from a cylinder block after the bearing caps and cylinder block have been bored. (The operation occurs before the crankshaft's installation.)

The automatic machine operates on continuously moving conveyor

A COMPLETE REFRACTORIES SERVICE . . .

for the Steel Industry

OLIVE HILL BF and OLIVE HILL HI-FIRED brick rank high in any list of prominent and widely used brands of blast furnace refractories. Manufactured from dense-burning Kentucky flint fire clays by Grefco's unique manufacturing processes, OLIVE HILL brick set a standard for blast furnace refractory quality and workmanship.

Grefco processing of OLIVE HILL brick entails:

1. Careful selection, testing, stockpiling and blending of fire clays to insure uniform raw material quality.
2. Grinding and screening to prescribed formula to promote high density of product.
3. Efficient desiring during brick forming, also to promote density and proper physical structure.
4. Careful firing to exacting temperature schedules yields uniform high quality brick.
5. Close inspection of final product with gauging and sorting of brick to close size tolerance.
6. Quality control by statistical analysis procedures for the manufacturing processes.

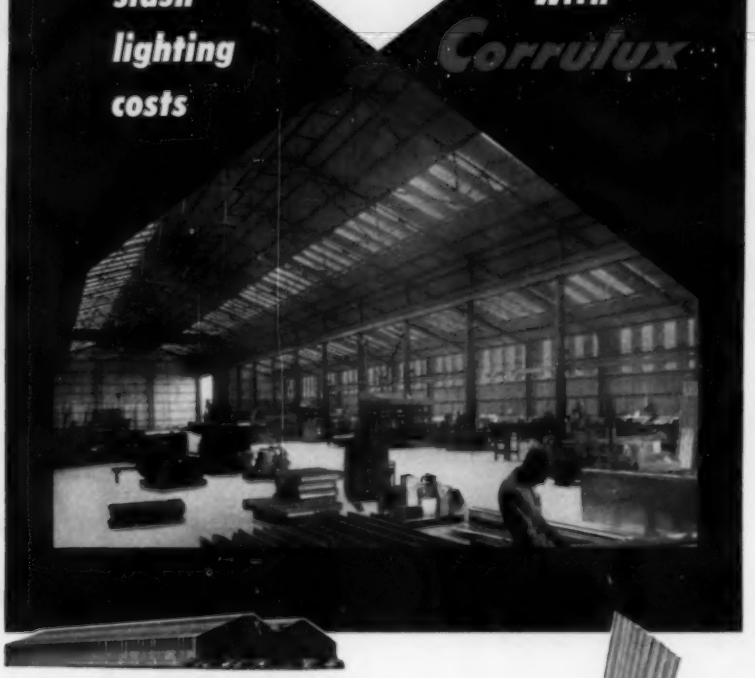
In service, OLIVE HILL blast furnace brick, both BF and HI-FIRED, have produced many splendid performance records in the past. OLIVE HILL linings in presently operating furnaces, are giving outstanding performance and are more than meeting the increasing requirements of the expanding American Iron and Steel Industry.

GENERAL REFRACTORIES CO.
Philadelphia 2, Pa.

GENERAL REFRACTORIES

daylight's free!

slash lighting costs with Corrulux



HERE'S PROOF:

... in this 57,000 square foot fabricating plant.

ESTIMATED LIGHTING COST — $600.00 PER MONTH
(12 HR. DAY, NO SKYLIGHTS)

ACTUAL LIGHTING COST — (LESS THAN) $100.00 PER MONTH
(WITH CORRULUX)

SAVINGS — $500.00 PER MONTH

Corrulux is available in a wide range of sheet sizes and corrugations to match standard roofing and siding.

Flat Corrulux panes are ideal for industrial glazing . . . permit you to reglaze for the last time.

Obviously, one year's savings will more than absorb original Corrulux cost — take it from there. Just figure your added profits in ten years!

For new construction or existing daylighting problems... let us show you how you can make similar savings.

LOF GLASS FIBERS Corrulux®

Corrulux®

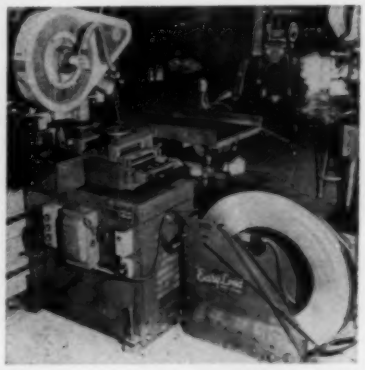
L.O.F. GLASS FIBERS COMPANY,
P. O. BOX 20026, HOUSTON 25, TEXAS

NEW PRODUCTS and equipment

lines and has a capacity of 2000 bolts an hour. *Write*: Reed Roller Bit Co., P.O. Box 2119, Houston, Tex. *Phone*: Walnut 6-3121

Feeding Machines

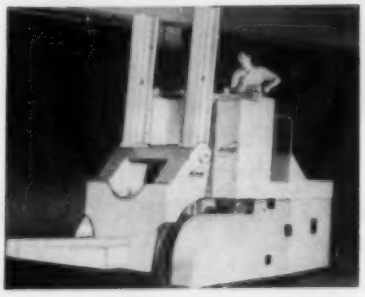
The R series of straightening and feeding machines has width capacities of 10, 15, 20 and 24 in. Thickness capacities for mild steel are from 0.125 in. on 10-in. widths to 0.045 in. for 24-in. widths.



Feed rates are 18 to 95 fpm. *Write*: Rowe Machinery & Mfg. Co., 1506 N. Industrial Blvd., Dallas, Tex. *Phone*: Riverside 1-6365

Ram Trucks

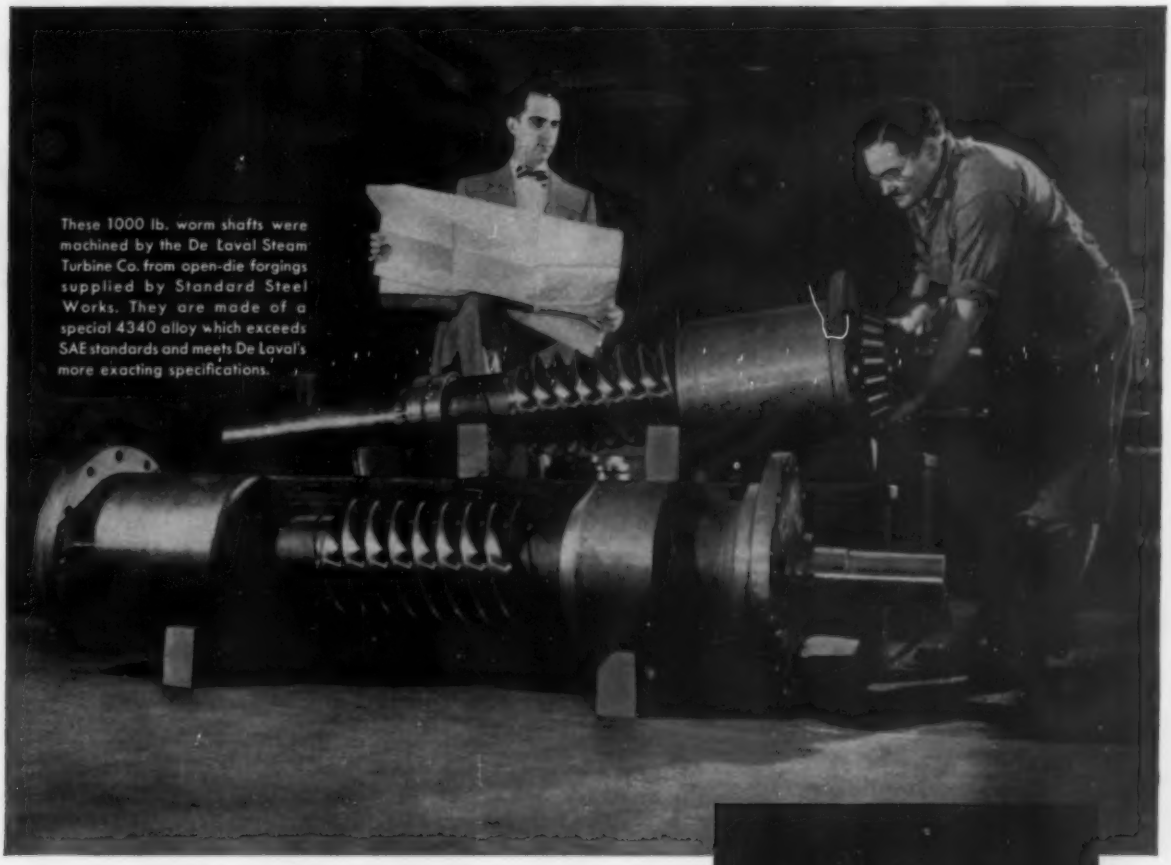
Capacities of 20,000 to 80,000 lb are provided by this series of trucks. Dual drive motors are used to meet the heavy power demands.



Power steering and power brakes are used. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Borer Has Two Ways

Simultaneous operations can be done at both ends of a part by this machine.



These 1000 lb. worm shafts were machined by the De Laval Steam Turbine Co. from open-die forgings supplied by Standard Steel Works. They are made of a special 4340 alloy which exceeds SAE standards and meets De Laval's more exacting specifications.

"It used to take us 12 weeks to get the required forgings for these worm shafts. We now get them in 6 weeks —from Standard Steel Works"

We accommodate De Laval's Mr. Schwarz in two ways so as to give him the service he wants: (1) We keep ingots and billets of the special high quality steel De Laval demands on order point—we can meet even the largest requirements on short notice; (2) each forging is tested and inspected—the product of complete and precise quality control. Mr. Schwarz knows he can expect not only service, but also quality when he orders forgings and castings from us.

Mr. Schwarz is just one of many industrial executives who have been impressed with the extra *service* we enjoy rendering. Not a month goes by that De Laval doesn't come to us with some special request which we can meet, and cheerfully. And hardly a day goes by that one of our many customers doesn't put our boast of personalized service to the test. Why don't you let us handle your next forging or casting requirement. You'll appreciate our service as well as our know-how. Write Dept. 2D.

"It's not unusual for me to be invited out on the floor to talk with the men who are actually making castings and forgings for us. In my opinion it's the personal interest which the men at Standard take in a customer's order that lies behind the consistently excellent service they render," says *E. T. Schwarz, Director of Purchasing, De Laval Steam Turbine Co., Trenton, N.J.*

Standard Steel Works Division

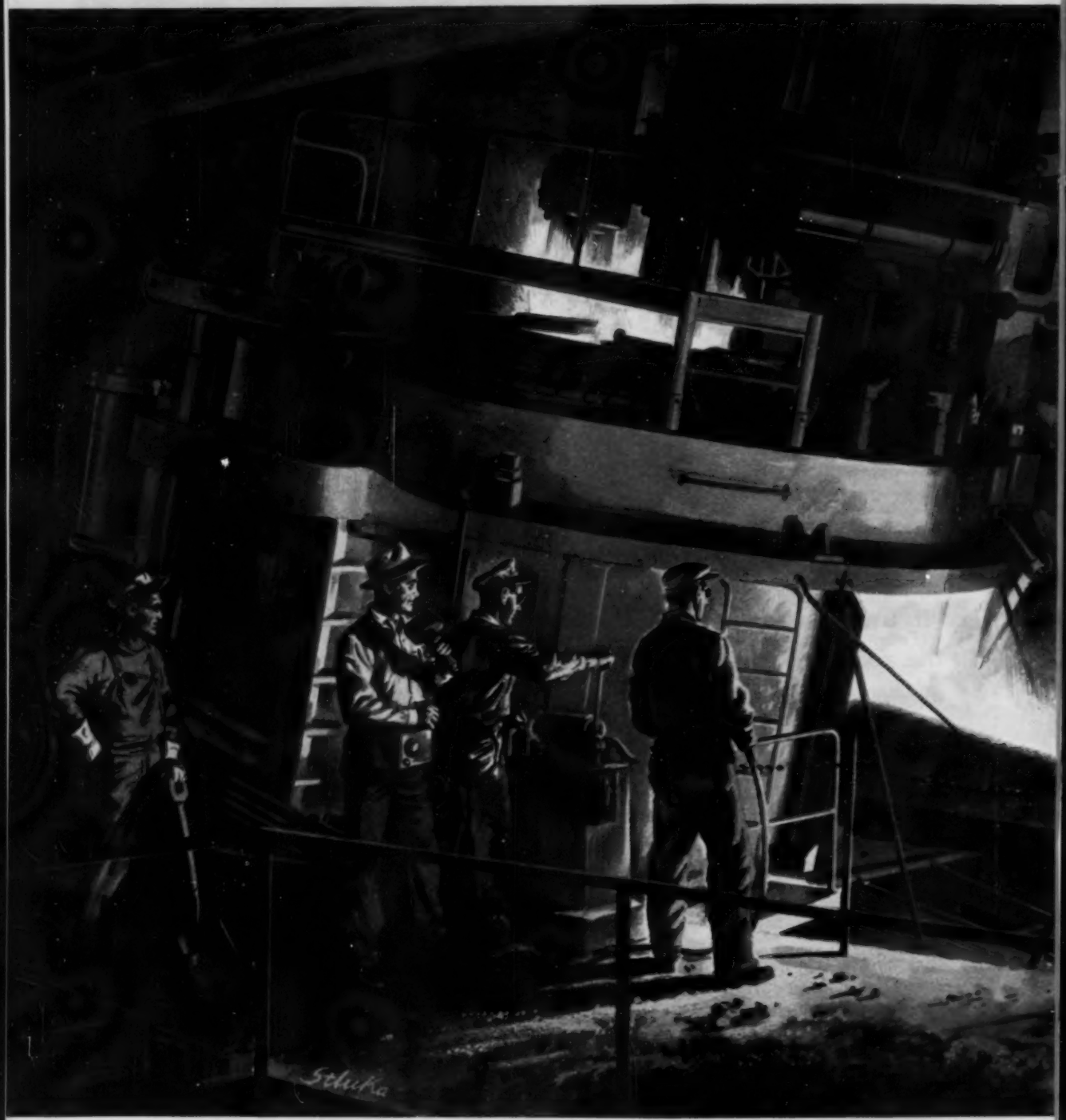
•BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON

ALLIS-CHALMERS.



Products for steel: motors, m-g sets, control, pumps, *Texrope* drive equipment, crushers, mills, screens, rectifiers, transformers, substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, synchronous condensers, and water conditioning equipment.

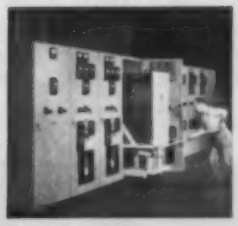
ALLIS-

. in Step with STEEL

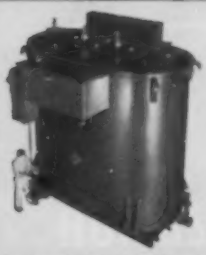
The arc furnace

Reduced costs result when Allis-Chalmers control, transformers and switchgear are specified for arc furnace application. The reason: A-C offers these products as a specially-integrated electrical system — designed by experts in furnace requirements and backed by Allis-Chalmers 75 years of experience in supplying equipment to the steel industry.

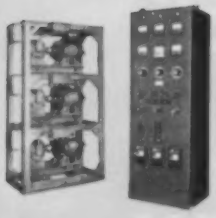
Wherever steel goes — from mine to final processing — Allis-Chalmers equipment is available to keep quality high, keep steel moving fast and profitably. Contact the A-C representative in your district, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.



Arc furnace switchgear provides safe, dependable protection for transformer and related equipment. Special alloys assure long arcing contact life under severe interrupting duty, keeping maintenance and downtime to a minimum.



Transformers are of well-balanced designs and built for heavy duty . . . performance has been proven in 25-30 years of repeated daily short-circuits in electrical furnace operation.



. . . **and Control** requirements are met by Magnetic Amplifier and Regulex controls which balance arc current with arc voltage to maintain desired arc condition automatically. These controls result in high tonnage per kwhr, long life for electrodes and furnace linings, and a minimum of maintenance.

CHALMERS

A-C ALLIS-CHALMERS

Regulex and Texrope are Allis-Chalmers trademarks.

A-5363

NEW PRODUCTS and equipment

A three-station fixture and three boring spindles on each slide produce three parts in each automatic cycle. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Radial Machine Base

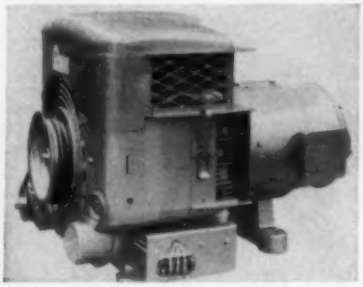
The M60C is a standard component for automated drilling and tapping machines.

Two radial tee slots make adjustment easy.

The cast iron top is 64 in. in diameter and has a working surface 56 in. in diameter. *Write*: Hause Engineering, 809 S. Pleasant St., Montpelier, O. *Phone*: 5-3158

Electricity for Magnets

Model 5CCK-150 is an electric generating plant that supplies 5000 watts. The set is driven by a 12.9-hp gasoline engine and is suitable for operating magnets which need currents up to 20 amperes at 250 volts.



The generator is connected directly to the engine. *Write*: D. W. Onan & Sons Inc., 2515 University Ave. S. E., Minneapolis 14, Minn. *Phone*: Federal 2-1155

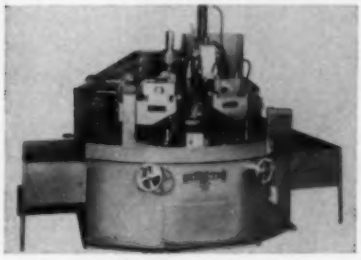
Vertical Lathe

This chucking machine supports its tool slides at both ends to provide maximum rigidity against cutting forces. Tool positions are adjusted by calibrated eccentrics.

They are cycled automatically by hydraulic controls which use a differential feed system.

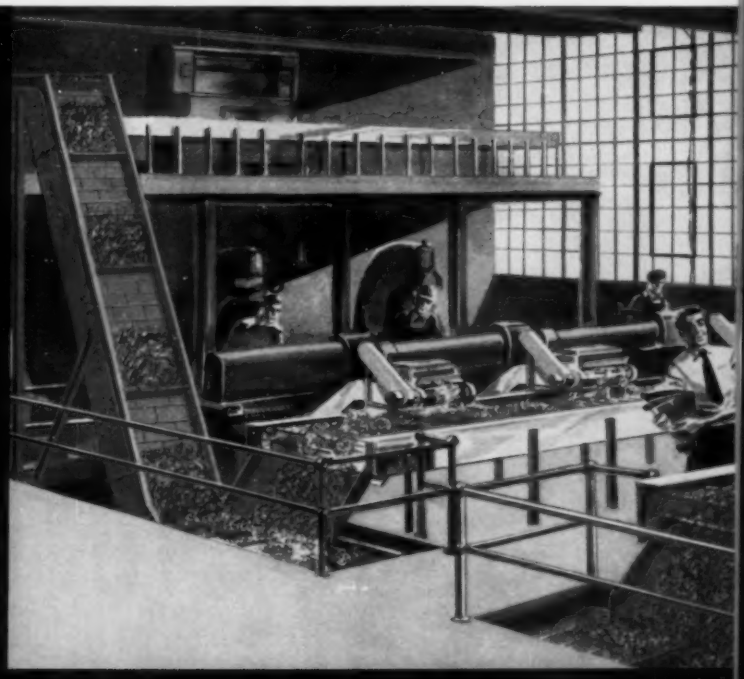
The tool slides can be operated simultaneously or in any desired sequence.

Depth of feed and slide travel are controlled by a positive stop. *Write*: Cleveland Hobbing Machine Co., 1311 Chardon Rd., Cleveland 17, O. *Phone*: Kenmore 1-5240



MAY-FRAN

Conveyor Standardization SAVES YOU MONEY...



NOW...

NEW Literature

Write directly to the company for a copy

Aircraft Fasteners

Bulletin 8-350, 14 pages, presents technical information on pin and stump type fasteners. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

Traveling Crane

A hand crane available in capacities of 3 to 10 tons is described in bulletin DH-459A, 4 pages. Wright Hoist Division, American Chain & Cable Co. Inc., York, Pa.

Automatic Dust Collection

This 8-page bulletin describes a system which automates the power inputs of electrostatic precipitators. Research-Cottrell Inc., Bound Brook, N. J.

Automatic Soldering

This 4-page bulletin describes equipment adaptable to all types of soldering. Castle Machines Inc., 1049 E. 20th St., Erie, Pa.

Carbon Monoxide Analyzers

This 4-page bulletin describes analyzers for the automatic detection of dangerous concentrations of carbon monoxide. Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Box-Type Furnaces

Bulletin 28-150, 12 pages, discusses furnaces with top temperatures of 300 to 3100°F for use in toolrooms. Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa.

Brazing Alloys

Bulletin SD-23, 4 pages, describes high temperature brazing alloys and fluxes for stainless steels and special alloys. Stainless Processing Division, Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich.

Bearing Metals

Advantages of babbitts of five hardness ranges and their uses are discussed in this 4-page bulletin. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Weather Sealers

This 4-page bulletin describes a line of sealers for curtain walls, building panels and expansion joints. Adhesives & Coatings Division, Minnesota Mining & Mfg. Co., 423 Piquette Ave., Detroit 2, Mich.

Cold Forming

Bulletin ADV-746, 4 pages, describes the cold reduction of steel bars into multidiameter shaft blanks ready for finish turning or grinding. Advertising Divison, Republic Steel Corp., 3100 E. 45th St., Cleveland 27, O.

Press Room Equipment

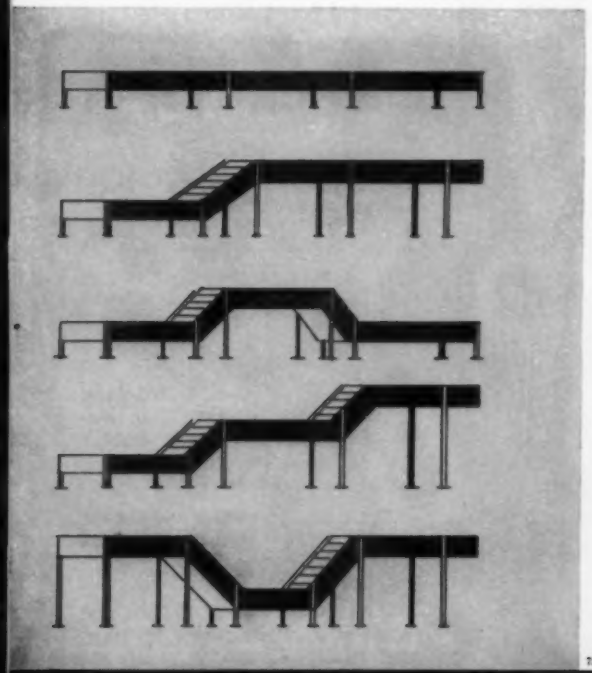
This 16-page bulletin covers cradles, straighteners, reels, feed units and scrap cutters for the handling of coil stock. Sesco Inc., 8881 Central Ave., Detroit 4, Mich.

Valve Regulators

Bulletin 1082 Rev. 2, 12 pages, describes low pressure balanced regulators with interchangeable inlet bowls. Meter & Valve Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Refractories

Bulletin 320, 2 pages, describes a corundum-base castable refractory for service up to 3350°F. A heat setting patch for general use in found-



Here is a conveyor program designed for the unusual. NOW . . . you can have a customized conveyor today to meet production needs . . . and with modification, that same conveyor will meet the needs of tomorrow.

The May-Fran conveyor standardization program provides the standard components that can be assembled to form a special or standard conveyor. These same components can be re-arranged at any time to solve production problems in the future.

In addition, standard components mass produced mean conveyor economy right from the beginning.

Here is a conveyor program of standardization program that saves you money now . . . and in the future!

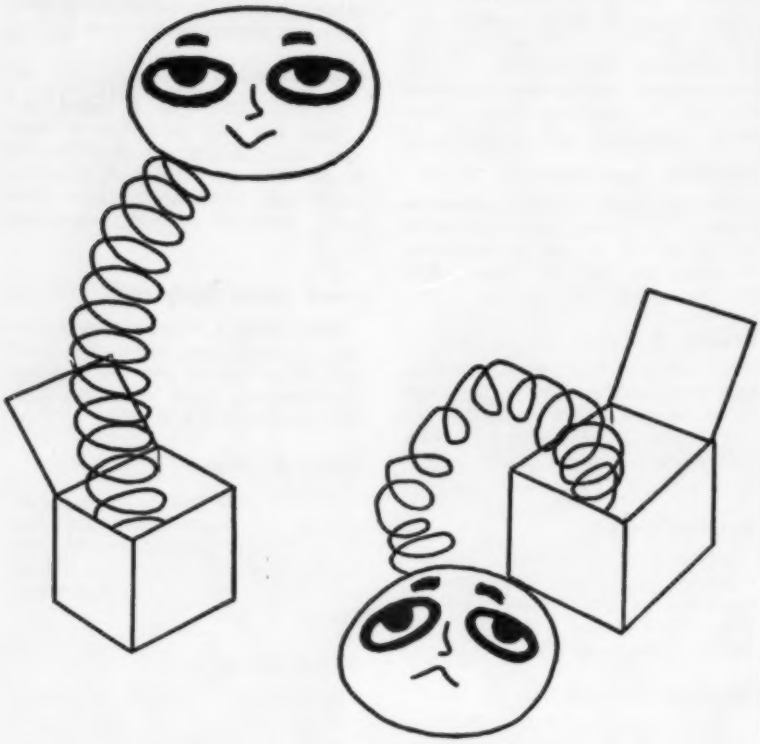
Write today for your copy of Bulletin MF-200

7321-MF

and in the **FUTURE!**

MAY-FRAN ENGINEERING, INC.

1725 Clarkstone Rd., Cleveland 12, O.



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NEW LITERATURE

ries is covered in bulletin 321, 2 pages. Chas. Taylor Sons Co., a subsidiary of National Lead Co., P.O. Box 58, Annex Station, Cincinnati 14, O.

Production Painting

Automatic transverse spray finishing machines for flat or curved work are described in this 12-page bulletin. DeVilbiss Co., Toledo 1, O.

High Temperature Alloys

This 20-page bulletin gives the engineering properties and fabrication characteristics of ten high strength alloys for elevated temperature service. Carpenter Steel Co., 339 W. Bern St., Reading, Pa.

Gear Honing

Advantages of honing spur and helical gears are presented in this 4-page bulletin, H-57-2. National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

NEW BOOKS

Report on Elevated - Temperature Properties of Wrought Medium-Carbon Alloy Steels, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 127 pages, $4.25.

This graphic summary of strength data includes curves for tensile strength, 0.2 per cent offset yield strength, per cent elongation and reduction in area, stresses for rupture in 100, 1000, 10,000 and 100,000 hours and stresses for creep rates of 0.0001 and 0.00001 per cent an hour.

1957 Silicone Rubber, F. L. Kilbourne Jr., A. S. Kidwell and T. S. Moroney, Connecticut Hard Rubber Co., 407 East St., New Haven 9, Conn. 48 pages, $1.

The chemistry, properties and the design of silicone rubber are discussed in this book.

Work Sampling, Robert Heiland and Wallace J. Richardson, McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y., 243 pages, $6.

This how-to treatment of work sampling explains the theory, furnishes necessary statistical information and gives instructions for planning, carrying out and interpreting a study.

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Corbart melting-end bridgewall, in tank described below, after 21 months and 6 days of service . . .

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The cost of Corhart Electrocast is higher *per ton* of blocks, but analyses of cost and results in many units prove beyond question that it is by far the most economical refractory *per ton of glass produced*. Glass factory profits are determined by the cost of *finished ware* and NOT by the cost of the tank blocks.

The following is a typical example of many actual records:

	CORHART BALANCED TANK	CLAY TANK (AVE. OF 5 FIRES)
Cost, labor and materials	$11,100.00	$8,000.00
Life (days)	648	289
Tons of glass produced	22,087	7,274
Tank cost per day	$17.12	$27.70
Tank cost per ton of glass produced	$0.503	$1.10
Melting area	18 x 32	18 x 32

With the outlook for large tonnage demand and the desirability of continuous operation, such economies as these cannot long be ignored. Corhart Electrocast is the answer to the crying demand for a better glass furnace construction material and proof of economy. *Address:* Corhart Refractories Co., *Incorporated*, 16th & Lee Sts., Louisville, Ky.

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In 1957, Corhart 104 is still relatively new in the steel industry. It is also "one of the world's highest-priced refractories". Yet it offers open-hearth furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to glass manufacturers.

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The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, *Incorporated*. Corhart Refractories Co., *Incorporated*, 1602 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471

STEEL

April 15, 1957

Market Outlook

ORDER backlogs continue to provide resistance to the down-pressure in the steel markets. Soft spots still show up, but, over-all, the situation is no softer than it has been recently. Buying is on the cautious side. Steelmaking operations are still slipping, reflecting easing demand pressure.

There are a few signs indicating the bottom of the demand slump may be near, especially in cold rolled sheets. The steelmakers, however, are not banking too heavily on a sharp revival in auto requirements. April volume will better that of March, they say, while May and June automotive needs will be substantially heavier.

PRICES TO RISE—Higher prices are in prospect for most products around midyear. Except for tin plate, though, there is only minimum forward specifying as a hedge against higher prices. Consumers of tin plate are pressing for maximum shipments to beat a price hike scheduled at the end of this month.

The same interest is not exhibited in other products though increased prices are indicated for midyear to compensate for a scheduled steel wage boost. More beat-the-price-advance buying may develop over the next few weeks.

DEMAND SLUGGISH—April sheet and strip volume is disappointing. But a somewhat stronger situation is seen developing because of the liquidation of consumers' stocks, notably cold rolled. Auto makers have not cut back May orders to the extent they did in the first three months. They are expected to begin actively ordering June needs shortly.

Mill backlogs on carbon sheets are thin. Rolling schedules are increasingly supported near capacity by strip plate production. The strip mills are taking light plate orders through second quarter.

PLATES EASIER—Active production of light gage plates on the strip mills is beginning to affect marginal suppliers of heavy gages. Gray market operators are reported offering 3-in. plates at prices under the warehouse level. Up to now, they have been able to command high premiums. This development would indicate heavy plates are in less critical supply.

Some steelmakers have opened third quarter books, but orders so far are too light to indicate a trend for the period. Some mills think third quarter bookings may top second quarter volume.

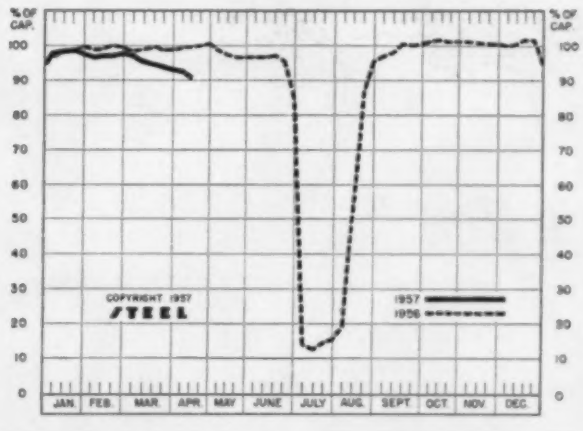
PRODUCTION— Steelmaking operations continue to slide. The national ingot rate last week declined another 2 points, being estimated at 90.5 per cent of capacity. This is equivalent to production of 2,316,000 net tons of steel weekly, smallest since last summer's steel strike.

There is nothing in the market to indicate that the production decline is on bottom. Generally, it is felt the ingot rate may gradually slip a few more points before stabilizing.

SCRAP GOES DOWN—Steelmaking scrap prices declined for the tenth consecutive week, pacing the drop in ingot operations. The scrap composite last week slipped to $44 a gross ton, a new low since September, 1955.

Price composites held unchanged at $139.71 for finished steel, $64.70 for No. 2 foundry iron, $64.23 for basic iron, and $65.77 for malleable.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Apr. 14	Change	Same Week 1956	Same Week 1955
Pittsburgh	95	0*	103	98
Chicago	90	+ 3*	103	98
Mid-Atlantic	95	0	99	95
Youngstown	89	0	100	96
Wheeling	93.5	+ 3.5	98.5	91.5
Cleveland	91	— 2.5*	95.5	98.5
Buffalo	97.5	— 0.5	106	104.5
Birmingham	95.5	— 1.5	93	90
New England	55	—10	85	82
Cincinnati	81	— 8.5*	93.5	99.5
St. Louis	101	0	99.5	90
Detroit	95.5	0*	95.5	88
Western	102	— 2	104	98
National Rate	90.5	— 2	99.5	95.5

INGOT PRODUCTION‡

	Week Ended Apr. 14	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	144.9†	144.4	149.5	154.6
NET TONS (In thousands)	2,328†	2,319	2,401	2,483

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,481,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 69 Technical Outlook—p. 125

How many costs are hidden in bundled stainless scrap?

SOME that you know of — the cost of handling, the space it requires, and the melting loss you've already figured on.

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World's largest producer of secondary nickel alloys of certified analysis

Heavy Japanese demand for steel is the big reason why . . .

Semifinished Exports Rise

JAPAN leads the procession of foreign nations knocking on the doors of American steel company export managers for larger quantities of semifinished steel. For the first time in many years, the callers are welcome.

It's not that foreign callers have been given the cold shoulder treatment by the steel companies. But it's a well known fact that there have been little more than token tonnages of semifinished steel available for export at a time when overseas demand has been at its heaviest. Now that domestic consumption has let up a bit, steelmakers welcome this chance to help absorb some of the excess, especially in blooms, billets and slabs. There are even more hot rolled coils available for export this year than last. Managers of export divisions—often looked upon as the stepchild of the steel industry—say they could use more tonnage, but they are happy with the present situation.

Fleeting Thing — Semifinished steel seldom has received as much attention in export markets as it has today. For instance, last year even though about 8 per cent of all steel exports were semifinished, this product stood well down the list from structural steel and plate, line pipe, tin and terne plate and hot and cold rolled sheets. This year it may well rank among the leaders. "There's no telling how long this thing will last," says one vice president of exports. "There is no question that semis constitute a greater portion of our exports now than they have for many years. But if domestic consumption of steel rose suddenly—such as automotive use—we would have to cut down on our allotment of semifinished steel for overseas shipment."

Japan is the logical market for semis. Its shipyards are booked to capacity, and a larger portion than usual of its domestic ingot capacity is going into ship plates and structurals. Nipponese buyers are taking as much coiled stock and semifinished steel as they can get for rolling down into galvanized sheets and other products. The Japanese galvanized sheet industry supplies a large part of the Oriental market with thin coated sheets (32 gage in some cases) for roofing of natives' huts.

Matter of Dollars—Other countries would like to buy in America, but often it's a case of dollar deficiencies. Latin America is a tremendous potential market, but political conditions and financial instability preclude any large scale export activities in that direction. European countries are still importing some American steel, but again dollar credits and higher prices hold this market down.

Just how much steel Japan will buy this year will not be known until the government releases American dollars for its fiscal year which began Apr. 1. Exporters say that significant orders are already on hand in anticipation of favorable action, but they will not ship until they see the money. Then there will be a flurry of activity, making shipping facilities tight for a while.

Via Panama—Practically all of the increased exporting is going on in the East and through the Mississippi river. West Coast steelmakers are still operating at capacity to satisfy their own area's needs. Delivery time is only as long as it takes to make the steel and ship it, usually by way of the Panama canal.

The tonnage of all steel exports is only a small percentage of total finished steel shipments (4.35 per cent last year), so even a sizable increase in the exportation of semifinished steel would have little effect on the nation's steelmaking rate. But producers report that even this small tonnage does help to firm their operations.

Steel Shipments Decline

Shipments of finished steel products totaled 7,066,732 net tons in February, reports the American Iron & Steel Institute. This compares with 7,809,451 in January, and with 7,468,393 in February a year ago.

Largest shipments in the month went to the following market classifications: Warehouses and distributors, 1,357,341 tons; automotive, 1,327,039; construction (including maintenance), 997,208; containers, 554,772; machinery, industrial equipment and tools, 424,511; rail transportation, 383,499.

The principal products shipped in February were: Sheets and strip, 2,347,141 tons; bars and tool steel, 1,084,547; pipe and tubing, 904,581; plates, 763,033; tin

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Basic Micromatic "150" Machine, suitable for both internal and external Microhoning.

Now, even manufacturers with limited capital can afford Microhoning . . . with all its benefits including efficient stock removal, accurate geometry and controlled surface finish. The new Micromatic "150" Hydrohoner is the answer!

Because it is standardized and produced in quantity, this quality machine is economical. (Special engineering is limited to tooling and fixturing.) The design and quality of the "150" assures performance equal to more expensive honing machines. It has a 12" stroke and Microhones diameters up to 1½" . . . yet requires just 34" x 52" of floor space.

The Micromatic "150" is ideal for the manufacturer with limited capital, short production runs or a need for standby equipment. Immediate delivery from stock on basic machines.

The principles and application of Microhoning are explained in a 30-minute, 16mm, sound movie, "Progress in Precision" . . . available at your request.

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MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

mill products, 528,627; structural shapes and piling, 582,823 tons.

Steel Bars . . .

Bar Prices, Page 188

Cold finished carbon and alloy bar volume is slack. Except for processed specifications, deliveries are prompt. Hot rolled heavy rounds and flats are in good demand, relatively. Forge and screw machine shops are buying close to requirements, although orders for June are slightly improved.

More consumers indicate their June buying will be ahead of that for May. Part of this is seen as a hedge against higher prices. Users placing June volume insist on shipment during the last month of the quarter, or before prices advance.

With production expected to start January, 1958, the Cleveland ordnance plant, Cadillac Division, General Motors Corp., has a contract for construction of self-propelled 90mm guns, M-56, costing $17,200,000. The Harvey Machine Co., Torrance, Calif., has a $1.6 million contract for 20mm projectiles for the Navy.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 189 & 190

Republic Steel Corp., Cleveland, has added long ternes, roofing ternes and fire door ternes to its diversified line of sheet and strip products. They will be produced at the company's Warren, O., mills on a modern continuous coating line.

Unless more buying develops as protection against a midyear price advance, sheet and strip volume this quarter will not come up to expectations. Bookings would slip below those of the first three months.

Most producers of hot rolled carbon grades are still accepting orders for May delivery, although normal lead time for that month has expired. The ability of mills to book orders late each month and still make prompt delivery tends to retard forward buying.

Users fabricating automotive parts have difficulty in buying ahead, limited by short runs and uncertainty as to requirements. They want fast delivery and frequently change specifications. Automakers have not cut back

orders for May to the extent they did in the first quarter and an improvement is expected in June demand. This indicates a gradual strengthening in the cold finished sheet market.

Strip mill operators plan to continue to supply plate through the second quarter. They are taking orders for June delivery and expect no substantial increase in automotive demand before then.

Galvanized sheet sales remain light, with no improvement in demand for construction applications.

In the Los Angeles district, demand for sheet and strip is not as strong as had been anticipated. Cancellations of significant tonnage by auto manufacturers, stemming from a strike at the local Chrysler plant, depressed the market. Sellers in that district expect a pickup in demand in May.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 188

Reinforcing bars are in easier supply. More of this product is being rolled because of lessened demand for merchant bars. Some construction jobs are not getting to the bidding stage as quickly as had been expected. Reason: delays in engineering them. Also, a few projects are being postponed.

Plates . . .

Plate Prices, Page 188

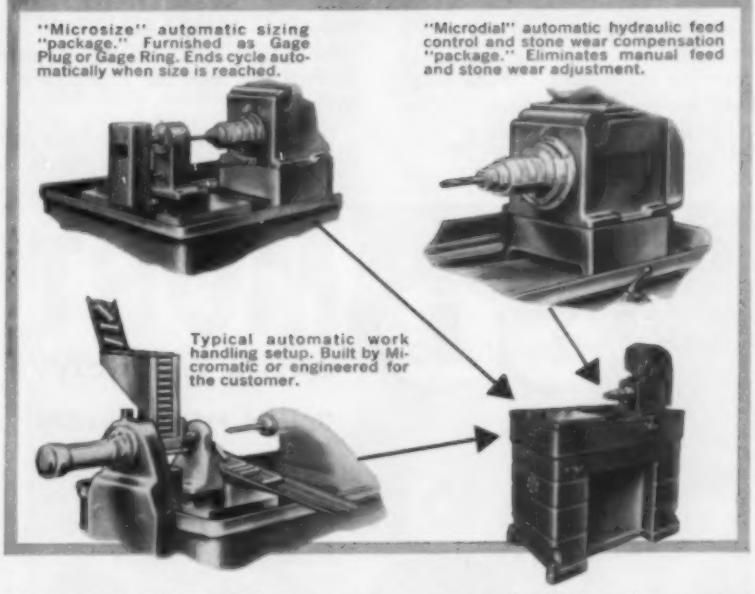
Shops fabricating light and narrow carbon plates, 72-in. and under, have built up inventories in the East, and all the tonnage offered them in this category for second quarter is not being taken. This has eased the supply situation for small tank and railroad car builders.

There is no noticeable easing in heavy plate supplies. Most mills are allocating tonnage with June order books filling up quickly where producers are accepting business for that rolling.

Shipbuilding requirements in the East are expected to be up noticeably through the remainder of the year.

More than 80 per cent of the plate fabricators in New England are no longer cramped for steel supplies. The bulk of consumption is plates under 1-in., and supplies are now in excess of demand.

How NEW "150" HYDROHONER Can Be Automated to Any Degree . . . Easily . . . Economically


"Microsize" automatic sizing "package." Furnished as Gage Plug or Gage Ring. Ends cycle automatically when size is reached.
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Typical automatic work handling setup. Built by Micromatic or engineered for the customer.

The basic Model "150" Hydrohoner is a new, standardized and economical Microhoning machine . . . priced for manufacturers with limited capital or relatively short production runs.

The basic machine features automatic stroking and hydraulic initial tool expansion and collapse. Various degrees of automation can be easily added at any time to the basic machine as required by individual manufacturers' needs. Micromatic "package units" which provide specific automation functions are illustrated. Design of this basic horizontal machine and its stationary bridge facilitate addition of these "package units". For complete automation of the "150" Hydrohoner, Micromatic will build automatic work handling devices or assist users in designing their own automation of work handling.

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MICROMATIC HONE CORP.
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Some broker offerings under mill prices are reported.

Heavier gages required for weldments, power plants and heavy electrical equipment continue in tight supply; also low alloy, high tensile grades.

The easing in light plates has increased the flow of tonnage to the railroad shops, many of which formerly were taking fabricated parts for car repairs. Tank shops have increased operations, and inquiry for pressure vessels is more active.

Tubular Goods . . .

Tubular Goods Prices, Page 192

Prospects for further easing in plate supplies this quarter and next provide good news for buyers of line pipe. Currently, line pipe producers are operating below capacity due to the plate shortage. Orders for line pipe extend through 1960. Easing in heavy plates could shorten the wait for line pipe deliveries.

Most other tubular products are easier to obtain. Production is at capacity in oil country and pressure tubing. Mechanical tubing demand has slowed this month. The seasonal upturn in buttweld pipe demand has not yet developed in force.

Wire . . .

Wire Prices, Pages 190 & 191

Eastern wire mills are operating about 15 points under the average for the steel industry as a whole. Production of rods, in some cases, is being cut back sharply. Except for a seasonal pickup in highway accessories and reinforcing, buying is light.

May finishing mill schedules are filling slowly, including specialties. Users of heading, spring and manufacturers wire are not building inventories, and are ordering on the basis of consumption, frequently after the close of normal leadtime.

Some buying in anticipation of a midyear price advance is reported, but volume is limited.

Structural Shapes . . .

Structural Shape Prices, Page 188

The structural mills are doing noticeably better in meeting delivery promises. This includes wide flange sections which have been in extremely tight supply for months.

A leading eastern producer is operating increased capacity at a high level and is making progress against heavy order backlogs.

Standard structurals are in improved supply and fabricating shops are beginning to build some inventory in the smaller sections.

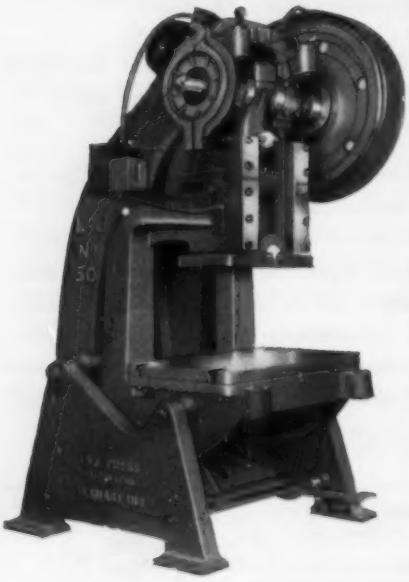
Heavy and wide plates, along with structurals, are providing major support to the ingot rate and rolling mill operations in eastern Pennsylvania. To some extent, this is true of other areas since more semifinished steel now is being diverted to plate and shape production with demand for sheets and strip still lagging.

Estimates close Apr. 25 at Albany, N. Y., on 20,540 tons, for fabricated bridge steel. One inquiry for 2300 tons for a superstructure is out for the third time. No bids were submitted previously.

Awards of contracts lag in the federal interstate highway pro-

L&J 50 SERIES

EXTRA CAPACITY WITH PRECISION TO MATCH



Large area dies are no problem when you have an L&J No. 50 Series press with its extra capacity. The exceptionally heavy frame provides maximum rigidity which enables the flanged, box-type ram to maintain precision alignment for precision jobs. The large work area will permit you to run a greater variety of work. Its dependability and tooling ease provide a new high in press efficiency.

Available in geared and non-geared models. Air clutch is available. It will pay you to get complete details now.

SPECIFICATIONS

Capacity: *Model 50*—50 tons, *Model 50B*—56 tons. **Shut Height:** 10" to 25". **Ram Stroke:** 3" to 8". **Ram Adjustment:** 3". **Ram Face:** 24" x 12". **Bolster Plate:** 36" x 24" x 2¼". **Throat Depth:** 12½". **Opening Thru Back:** 22". **Speed:** *Model 50* Non-geared—100 S.P.M., Geared—50 S.P.M. *Model 50B* Non-geared—95 S.P.M. Geared—46 S.P.M. *Higher speeds with air clutch.*

Write for Bulletin L-14

Describes L&J O.B.I. Presses. 23 Models, 14 to 90 tons, geared and non-geared. Also, 20 to 50 ton Double Crank, High Speed, Straight Side Presses.

L&J PRESS CORPORATION

1628 STERLING AVENUE, ELKHART, INDIANA

gram. New York, Ohio and Texas lead in that order.

Larger bridge steel tonnage cannot be delivered or erected this year, but smaller shops in the New York area are not as extended as they were, and they are using more standard structurals, bar shapes and smaller sections, enabling them to improve deliveries under competitive estimates in some cases.

Some 4500 tons are estimated required for industrial plants in New England, including 2070 tons, shop buildings, Waterbury-Farrel Foundry & Machine Co., Cheshire, Conn.

Mill and electrical equipment manufacturers have succeeded in building up their inventories of most structural shapes.

Tool Steel . . .

Tool Steel Prices, Page 192

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 9182 net tons in February, reports the American Iron & Steel Institute. This was off slightly from the 9457 tons moved in January, and down substantially from the 10,613 tons shipped in February a year ago.

Tonnage moved in the first two months this year was 18,639. This compares with 21,726 tons shipped in the like period of 1956.

Warehouse . . .

Warehouse Prices, Page 193

Demand for warehouse steel in March established a low since the first of the year. There has been only a slight upward trend so far in April. Some of the pressure for delivery of the products still in tight supply (heavy plate and wide flange beams) is easing off. Users have been able to fill more of their needs from mills.

Distributors have succeeded in replenishing their supply of light plate and other products. With sales to small industries at low ebb, they are adjusting their own inventories and cutting down on purchases from mills. Cold rolled and galvanized sheets are sluggish and warehouses are declining substantial tonnages offered by mills.

On the brighter side, distributors report an increase in inquiries for delivery of wire and pipe, although these inquiries are not backed up by sizable orders yet.

Pig Iron . . .

Pig Iron Prices, Page 193

Pig iron bookings are off a little this month. Gray iron foundry operations are spotty. Those supplying automotive castings can sight little pickup, but those serving the farm machinery industry are a little busier. Heavy snows and rains in the Midwest and Southwest are raising hopes of implement makers for larger sales this year.

Opening of the Great Lakes navigation season saw at least two boatloads of iron ready to move out of Buffalo and up the lakes to the Detroit area. Early season commitments for shipment of iron are encouraging, although the movement may not be quite as heavy as a year ago.

Export demand for pig iron is active. The following pig iron freight rates are reported: Five cargoes from North Atlantic to

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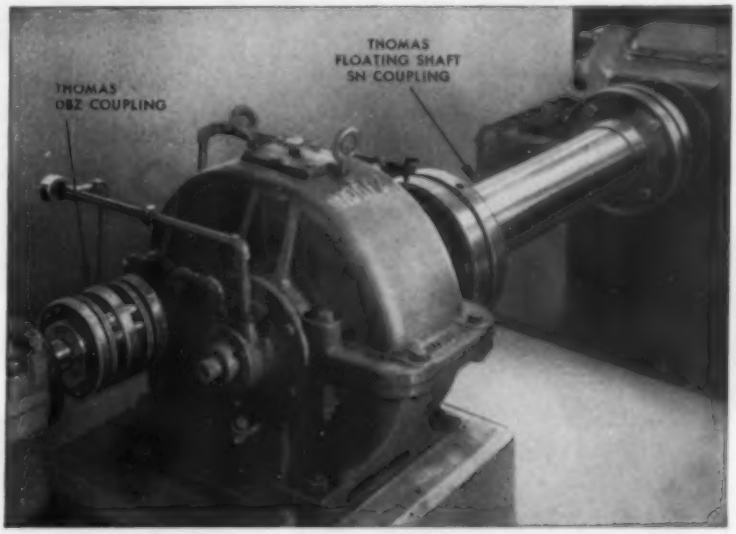
Give You Freedom From Coupling Maintenance



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They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

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4 Visual Inspection While in Operation
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Write for Engineering Catalog 51A

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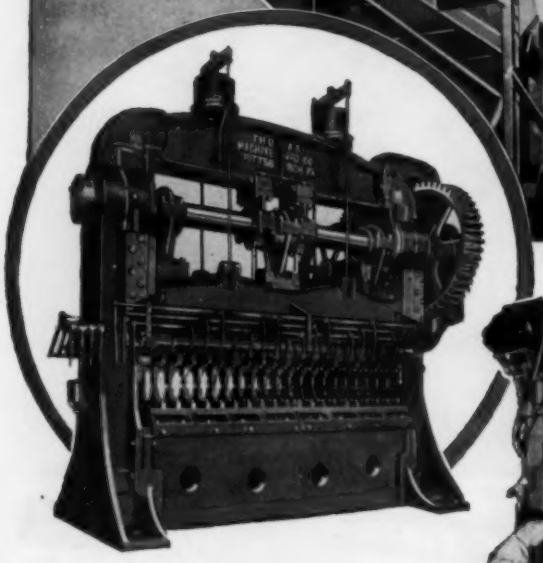
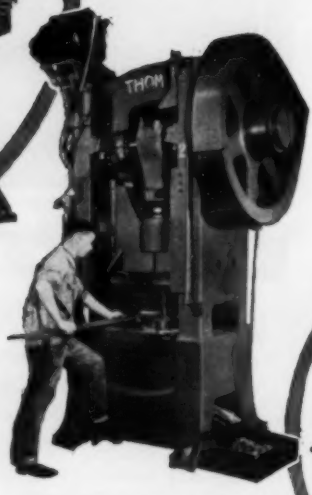
WARREN, PENNSYLVANIA, U.S.A.

AS IN THE PAST HALF CENTURY

the trend is to Thomas for '57





ABOVE — Modern Thomas power-driven Spacing Machine especially developed for the "short run" shop

EXTREME LEFT—Thomas 1,000-ton Multiple Punch built for railroad car shop

BELOW—This Thomas double-angle shears combines advanced design with typical Thomas dependability

ABOVE — Single-crank straight-side press, one of many Thomas models

For over 50 years Thomas has served the steel industry with equipment designed to increase output and decrease operating costs. Make sure the equipment you buy meets the needs of today...specify THOMAS.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

Japan, $20 to $21.75; from San Francisco, $14. Two cargoes of coke and pig iron for shipment from Stockton, Calif., to Japan were closed at $15.50.

Tin Plate . . .

Tin Plate Prices, Page 190

Tin plate producers expect to have their warehouses looking bare when month-end arrives. Consumers are pressing for maximum shipments to beat the price hike scheduled to go into effect at end of this month.

Jones & Laughlin Steel Corp. will advance its prices on tin mill products effective Apr. 30. This action is similar to that first announced by U.S. Steel Corp. several weeks ago.

Iron Ore . . .

Iron Ore Prices, Page 194

Severe ice conditions in the upper lakes is hampering early shipments of iron ore. But active loading of vessels at Duluth and Two Harbors, Minn., was scheduled to start late last week. The Pittsburgh Steamship Division, U.S. Steel Corp., had 28 vessels in operation last midweek.

Ferroalloys . . .

Ferroalloy Prices, Page 196

In a move designed to give impetus to the mass production of new electronic and solar energy devises, the Du Pont Co., Wilmington, Del., established four separate grades of hyper-pure silicon at generally lower prices. The action, attributable to substantial improvements in the manufacture of silicon, makes available to customers in the electronics industry three grades of semi-conductor silicon ranging from $360 to $160 a pound. It also reduced the price of solar cell grade from $150 to $100 a pound.

Wilson Marine Buys Ore Fleet

Wilson Marine Transit Co., Cleveland, O., and Northwestern Mutual Life Insurance Co., Milwaukee, acquired the entire bulk freighter fleet of 16 vessels of Great Lakes Steamship Co. Inc., Cleveland.

Wilson Marine bought 13 of the ships and Northwestern Mutual 3 from the liquidating 46 year old steamship firm. Wilson Marine will operate all 16.

Wilson sold six to Republic Steel Corp., Cleveland, O. and announced four others would be sold. Wilson will operate Republic's entire fleet of nine vessels. Wilson Marine (stockholders recently voted to change its name from Wilson Transit Co.) will have 20 carriers in its fleet with a capacity of 233,600 gross tons compared to 158,600 gross tons in its former fleet.

Alloy Steel . . .

Production of alloy steel (other than stainless and heat resisting ingots) totaled 683,409 net tons in February, reports the American Iron & Steel Institute. Of this, 655,893 tons were without boron, 27,516 tons with boron.

Output in the first two months this year amounted to 1,498,185 tons, of which 1,444,698 tons were without boron, and 53,487 tons with boron. Here is the breakdown:

PRODUCTION OF ALLOY STEEL INGOTS
(Net tons)

Grade	February, 1957 Without Boron	February, 1957 With Boron	YEAR TO DATE Without Boron	YEAR TO DATE With Boron
Carbon boron	.....	2,217	.....	3,939
Nickel	2,140	.....	4,782	.....
Molybdenum	59,118	4,474	129,122	8,268
Manganese	13,843	5,654	28,648	6,172
Manganese-Molybdenum	35,689	.....	68,203	.....
Chromium	105,475	6,520	238,162	16,911
Chromium-Vanadium	4,421	.....	10,905	.....
Nickel-Chromium	10,763	.....	23,645	211
Nickel-Molybdenum	32,056	865	67,933	1,506
Chromium-Molybdenum	89,644	.....	187,035	.....
Nickel-Chromium-Molybdenum	85,510	5,065	201,572	11,365
Silico-Manganese	6,608	.....	14,635	.....
All other	45,407	2,721	99,302	5,124
Subtotal	493,674	27,516	1,073,994	53,487
Other alloy:				
High strength steels	86,151	.....	169,059	.....
Silicon sheet steels	96,068	.....	201,645	.....
Total all grades	655,893	27,516	1,444,698	53,487

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TRIMMING KNIVES

Assure more continuous production and more tonnage from each grind

Cowles knives stay on the job longer. They keep mills in continuous production with minimum downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Any diameter, face or bore. Widely used by all principal producers and processors. *Let us quote on your requirements!*

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2050 WEST 110th STREET • CLEVELAND 2, OHIO

Specializing in the Manufacture of
ROTARY SLITTING KNIVES • SPACING COLLARS • ROTARY TRIMMING KNIVES • ROLL TURNING TOOLS • EDGING ROLLS • CUT-OFF KNIVES STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

Draw a 300-mile circle around your plant —

You're almost certain to circle one of Milford's five manufacturing plants!

There's hardly a metalworking plant in the country that isn't within overnight trucking distance of one of Milford's five manufacturing plants. And 20 sales offices add to the convenience of ordering and *getting* rivets when you need them NOW!

To improve product appearance and strength
. . . to take full advantage of automatic assembly
. . . to cut delivery time and production costs
—get in touch with Milford first!

THE MILFORD RIVET

MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNSYLVANIA
ELYRIA, OHIO • AURORA, ILLINOIS • NORWALK, CALIF.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

8000 tons, publishing plant, the *New York Times*, 63rd street and West End avenue, New York; Rheinstein Construction Co. Inc., New York, general contractor.

7335 tons, galvanized transmission towers, Utica Junction-Sioux Falls Line, DC 4844, and Fargo-Granite Falls Line, DC 4565, Bureau of Reclamation, Huron, S. Dak., to Anchor Metals Co., New York, through Lipsett Inc., New York.

4135 tons, 22-story office building, Packwest Realty Co., 662 Madison Ave., New York, to the Bethlehem Steel Co., Bethlehem, Pa.

3325 tons, state highway bridge, H-47-2, Onondaga county, New York, to the Schacht Steel Construction Co. Inc., New York.

2185 tons, superstructure, tri-level bridge, N-8-10, intersection Tri-State and Southwest routes, contract SN-8, Chicago, Northern Illinois toll highway, to the Allied Structural Steel Co., Chicago.

1900 tons, girder spans, Northern Illinois toll highway, crossing Calumet Sag channel between Robbins and Alsip, Cook county, Ill., for Illinois State Toll Highway Commission, Chicago, to American Bridge Division, U.S. Steel Corp., Pittsburgh.

1410 tons, superstructure, bridge, intersection Tri-State and East-West routes, contract ST-6, Elmhurst, Cook county, Northern Illinois toll highway, to the Mississippi Valley Structural Steel Co., Chicago.

220 tons, reserve hangar additions, NAS, New Orleans, to the Orleans Materials & Equipment Co., New Orleans; R. P. Farnsworth & Co. Inc., general contractor.

150 tons, state highway bridge, NSP 57-1, Nassau county, New York, to the Bethlehem Steel Co., Bethlehem, Pa.; Henriksen Bros. Co., New York, general contractor.

130 tons, building, Griffiss AFB, New York, to the White Plains Iron Works, White Plains, N.Y.; Beacon Construction Co., Boston, general contractor; reinforcing, Bethlehem Steel Co., Bethlehem, Pa.

100 tons, plant building, Allied Container Corp., Dedham, Mass., to the West End Iron Works, Cambridge, Mass.; Lilly Construction Co., Boston, general contractor.

100 tons, structurals and bars, beam bridge, Spaulding turnpike, Rochester, N.H., to the Bancroft & Martin Rolling Mills Co., South Portland, Me.; H. B. Fleming Co., Portland, Me., general contractor.

100 tons, structurals and bars, vocational school, Providence, R.I., to the Providence Steel & Iron Co., Providence (structurals); Plantations Steel Co. (bars); Molony & Rubien, Providence, general contractor.

Unstated, 300-ton gate lifter, St. Lawrence seaway, to the American Shipbuilding Co., Cleveland, $1,609,900.

STRUCTURAL STEEL PENDING

13,500 tons, state highway bridges, Brooklyn-Queens expressway, New York; bids Apr. 25, Albany, N.Y.

7900 tons, steel sheet piling, cofferdam, Barkley dam site, Livingston county, Ky.; bids to the U.S. Engineers, Nashville, Tenn.

7300 tons, state bridge, Roosevelt boulevard, Schuylkill river, Philadelphia; bids Apri. 26, Harrisburg, Pa.

2975 tons, state highway bridges, Bt-57-1, Rensselaer-Columbia counties, New York; bids Apr. 25, Albany, N.Y.

2300 tons, superstructure, state highway bridge FISH 57-9, Oswego county, New York; rebids for the third time, Apr. 25, Albany, N.Y.

2070 tons, shop buildings, Waterbury-Farrel Foundry & Machine Corp., Cheshire, Conn.; George A. Fuller & Co., Boston, general contractor.

1200 tons, state highway bridge, Upper Allen township, Cumberland county, Pa.; bids Apr. 26, Harrisburg, Pa.

1200 tons, 890-ft girder bridge, Eel river, U.S. 101, northern California.

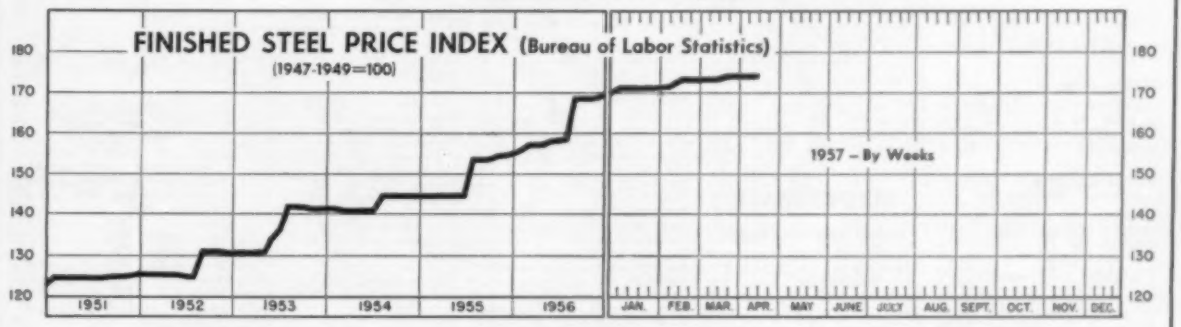
1135 tons, state highway bridge FARC-57-42, Sullivan county, New York; bids Apr. 25, Albany, N.Y.

635 tons, bridge, Broad street over Reading railroad, Phidadelphia; bids Apr. 18.

455 tons, aircraft shelters; bids direct, U.S. Engineers, Walla Walla, Wash., May 1.

(*Please turn to page* 199)

Price Indexes and Composites



Apr. 9, 1957	Week Ago	Month Ago	Mar. Avg	Year Ago
174.0	174.0	173.9	173.9	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 9

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.817	Bars, C.F., Carbon	9.910
Tie Plates	6.275	Bars, C.F., Alloy	13.450
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural shapes	5.667	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 430 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R. Stainless, 303 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	5.675	Pipe, Galv., Buttweld (100 ft)	23.034
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.566
		Casing, Oil Well, Alloy (100 ft)	288.980
		Tubes, Boiler (100 ft)	46.737
		Tubing, Mechanical, Carbon (100 ft)	23.713
		Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.433
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.133
		Black Plate, Canmaking Quality (95 lb base box)	7.233
		Wire, Drawn, Carbon	9.775
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.400
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 10 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	227.41	227.41	227.41	209.10	171.92
Index in cents per lb	6.161	6.161	6.161	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$139.71	$139.71	$139.51	$128.02	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70	64.56	60.06	52.54
Basic Pig Iron, GT	64.23	64.23	64.11	59.61	52.16
Malleable Pig Iron, GT	65.77	65.77	65.63	61.06	53.27
Steelmaking Scrap, GT	44.00	45.00	50.33	55.09	43.09

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 10 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R.,deld.,Philadelphia	5.365	5.365	5.365	4.93	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.35*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Contesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, ⅜-⅝" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	Apr. 10 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$65.50	$61.00	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	68.38	68.38	68.38	63.76	56.61
No. 2 Fdry, NevilleIsland,Pa.	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	68.88	64.26	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry(Birm.)deld.Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	65.00	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne.	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$42.50	$43.50	$50.50	$54.50	$44.00
No. 1 Heavy Melt, E. Pa.	48.50	50.00	54.00	56.00	42.50
No. 1 Heavy Melt, Chicago.	41.00	41.50	46.50	54.50	42.50
No. 1 Heavy Melt, Valley	39.50	39.50	48.50	53.50	44.00
No. 1 Heavy Melt, Cleve.	37.00	37.00	45.50	57.50	43.00
No. 1 Heavy Melt, Buffalo.	41.50	43.50	48.50	55.50	43.00
Rails, Rerolling, Chicago	54.50	55.50	59.50	72.50	52.50
No. 1 Cast, Chicago	39.50	39.50	42.50	51.50	49.00

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry, Connisvl.	18.00	18.00	18.00	16.50	17.50

Steel Prices

Mill prices as reported to STEEL, Apr. 10, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 189; to footnotes, page 191.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston 85 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 .....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 .....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling, Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston 85 .....96.50
Johnstown,Pa. B2 .....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ....101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19 .107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston 85 .....112.00
Ind.Harbor,Ind. Y1 ...107.00
Johnstown,Pa. B2 .....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ...107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14..111.50
S.Duquesne,Pa. U5 ...111.50

SKELP

Aliquippa,Pa. J5 .....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston 85 .....6.05
IndianaHarbor,Ind. Y1..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. 85 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P17 .....5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.60
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ...5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Atlanta A11 .....5.20
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.00
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston 85 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.00
KansasCity,Mo. 85 ....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 ....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14..5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange

Bethlehem,Pa. B2 ....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2 .5.25
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ...5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston 85 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston 85 .....7.45
Ind.Harbor,Ind. I-2, Y1.7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. 85 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.85
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ..4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 ....5.80
Houston 85 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14.4.85
SparrowsPoint,Md. B2..4.85
Sterling,Ill. N19 .....4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....7.00
Geneva,Utah C11 .....6.25
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston 85 .....7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston 85 .....6.95
Ind.Hrbor,Ind. Y1 .....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ...5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10..5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ...5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.275
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 .....5.075
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa.(9) U5 ....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ...5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Houston(9) 85 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2...5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo.(9) 85..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 ....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11..5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 ....5.825
Seattle B3, N14 .....5.825
S.Ch'e'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5..5.075
S.SanFran.,Calif.(9)B3 5.825
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.45
Torrance,Calif.(9) C11..5.775
Youngstown(9) R2, U5..5.075

BARS, H.R. Loaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ...6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind U5 .....6.125
Houston 85 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. 85 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ....7.425
Bessemer,Ala. T2 ....7.425
Bethlehem,Pa. B2 ....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,nId. U5 .....7.425
Houston 85 .....7.675
Ind.Harbor,Ind Y1 .....7.425
Johnston,Pa. B2 .....7.425
KansasCity,Mo. 85 ....7.675
Lackawanna,N.Y. B2..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14.7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ...8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2...5.225
Houston(9) 85 .....5.325
KansasCity,Mo.(9) 85..5.325
Lackawanna(9) B2 ...5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075
Tonawanda,N.Y. B12 ...5.45

BAR SIZE ANGLES: S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.075
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.85
SanFrancisco 87 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston 85 .....6.45
KansasCity,Mo. 85 ....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F., Loaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2..6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ...7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 ....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. W8 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ...6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13..6.85
Hartford,Conn. R2 ....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ...8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ...6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 ....7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ....6.85
SpringCity,Pa. K3 ....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 ....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ...8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.275
Birmingham C15 .....5.075
Bridgeport,Conn. N9 ...5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich G5 .....5.425
Emeryville,Calif. J7 ....5.85

Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 .....5.225
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex. (4) T4.5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2 Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles, Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda B12 .....5.65
Torrance,Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 .....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ¼-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4)(44) I-2 5.075
ChicagoHts.(4) C2 ....5.075
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ...5.075
JerseyShore,Pa.(4) J8 ..5.50
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 .....5.15
Tonawanda(4) B12 .....5.65
Williamsport,Pa.(3) S19 5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14. 16.80
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 .....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 .....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-strength Low-alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ...6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ...6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 ....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ...5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 .....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1..8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Irvin,Pa. U5	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.66	...
Pittsburgh J5	6.65	...
Pitts.Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS,, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ..6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ....7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md., B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W.Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.675
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.675
Bessemer,Ala. T2	4.675
Birmingham C15	*4.675*
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(28) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Evanston,Ill. M22	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.55
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Evanston,Ill. M22	6.95
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	...	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	10.10	12.30	15.30	18.25
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Detroit D2	8.75	10.20	12.40	15.40	....
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
Evanston,Ill. M22	8.65	10.10	12.30	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	...	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	8.65	10.10	12.30	15.30	18.25
NewCastle,Pa. B4, E5	8.65	10.10	12.30	15.30	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	...	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome,N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	17.10	20.95	25.30
Buffalo W12	...	...	17.10	....	....
FranklinPark,Ill. Tp	...	...	17.45	21.30	25.65
Harrison,N.J. C18	...	...	17.10	20.95	25.30
NewYork W3	...	...	17.10	20.95	25.30
Palmer,Mass. W12	...	...	17.10	....	....
Trenton,N.J. R5	...	...	17.10	20.95	25.30
Worcester,Mass. A7, T6	...	...	17.10	20.95	25.30
Youngstown C8	...	...	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	....	18.50	19.00	19.50
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md., B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Irvin,Pa. U5	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Irvin,Pa. U5	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$9.20
Irvin,Pa. U5	9.20

ROOFING SHEET TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPt.,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.90
Buffalo W12	11.90
Cleveland A7	11.90
Donora,Pa. A7	11.90
Duluth A7	11.90
Johnstown,Pa. B2	11.90
Minnequa,Colo. C10	12.025
Monessen,Pa. P16	11.90
Muncie,Ind. I-7	12.10
NewHaven,Conn. A7	12.20
Palmer,Mass. W12	12.20
Pittsburg,Calif. C11	12.70
Portsmouth,O. P12	11.90
Roebling,N.J. R5	12.20
SparrowsPt.,Md. B2	12.00
Struthers,O. Y1	11.75
Trenton,N.J. A7	12.20
Waukegan,Ill. A7	11.90
Worcester,Mass. A7	12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.70
Alton,Ill. L1	8.90
Buffalo W12	8.70
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	8.70
KansasCity,Mo. S5	8.95
Minnequa,Colo. C10	8.90
LosAngeles B3	9.65
Monessen,Pa. P7, P16	8.70
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	9.00
Pittsburg,Calif. C11	9.65
Portsmouth,O. P12	8.70
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.70
S.SanFrancisco C10	*9.65*
SparrowsPt.,Md. B2	8.80
Struthers,O. Y1	8.40
Trenton,N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	9.025
Alton,Ill. L1	9.225
Bartonville,Ill. K4	9.125
Buffalo W12	9.025
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	9.075
Johnstown,Pa. B2	9.025
LosAngeles B3	9.975
Millbury,Mass.(12) N8	9.325
Minnequa,Colo. C10	9.275
Monessen,Pa. P7, P16	9.025
Muncie,Ind. I-7	9.225
Palmer,Mass. W12	9.325
Pittsburg,Calif. C11	9.975
Portsmouth,O. P12	9.025
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	9.025
S.SanFrancisco C10	*9.975*
SparrowsPt.,Md. B2	9.125
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6, W12	9.325
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.45
Chicago W13	14.45
Cleveland A7	14.45
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.45
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	*14.45*
Kokomo,Ind. C16	14.45
Monessen,Pa. P6	14.20
Muncie,Ind. I-7	14.65
Palmer,Mass. W12	14.75
Roebling,N.J. C10	14.45
S.SanFrancisco C10	*14.80*
Waukegan,Ill. A7	14.45
Worcester,Mass. A7, T6	14.75

ROPE WIRE (A)

Bartonville,Ill. K4	12.00
Buffalo W12	12.00
Fostoria,O. S1	12.00
Johnstown,Pa. B2	12.00
Monessen,Pa. P7	11.55
Muncie,Ind. I-7	12.20
Palmer,Mass. W12	12.30
Portsmouth,O. P12	12.00
Roebling,N.J. R5	12.30
SparrowsPt.,Md. B2	12.10
Struthers,O. Y1	11.55
Worcester,Mass. J4	12.30

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.75
Monessen,Pa. P16	15.45
Roebling,N.J. R5	16.10

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Chicago W13	10.85
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	11.05
Franklin Park,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
New Kensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	.164
Aliquippa,Pa. J5	.164
Atlanta A11	.166
Bartonville,Ill. K4	.166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	.164
Duluth A7	.164
Fairfield,Ala. T2	.164
Houston,Tex. S5	.169
Jacksonville,Fla. (20) M8	175
Johnstown,Pa. B2	.164
Joliet,Ill. A7	.164
KansasCity,Mo. S5	.169
Kokomo,Ind. C16	.166
Minnequa,Colo. C10	.169
Monessen,Pa. P7	.164
Pittsburg,Calif. C11	.183
Rankin,Pa. A7	.164
S.Chicago,Ill. R2	.164
SparrowsPt.,Md. B2	.166
Sterling,Ill. (7) N15	.166
Worcester,Mass. A7	.170

NAILS, Stock

	Col.
Chicago W13	.164
Cleveland A9	.170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	9.63
Buffalo W12	9.93
Chicago W13	9.82
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.82
Duluth A7	9.82
Fairfield,Ala. T2	9.82
Houston S5	10.07
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	*9.82*
Joliet,Ill. A7	9.82
KansasCity,Mo. S5	10.07
Kokomo,Ind. C16	9.92
LosAngeles B3	*10.61*
Minnequa,Colo. C10	10.07
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	*10.60*
SparrowsPt.,Md. B2	*9.92*
Sterling,Ill.(37) N15	9.82

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	10.25
Chicago W13	10.15
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	10.15
Duluth A7	10.15
Fairfield,Ala. T2	10.15
Houston S5	10.40
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	*10.15*
Joliet,Ill. A7	10.15
KansasCity,Mo. S5	10.40
Kokomo,Ind. C16	10.25
Los Angeles B3	*10.95*
Minnequa,Colo. C10	10.40
Pittsburg,Calif. C11	10.95
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	*10.95*
SparrowsPt.,Md. B2	*10.25*
Sterling,Ill.(37) N15	10.15

Coil Interim	
AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	10.30
Chicago W13	10.20
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	10.20
Duluth A7	10.20
Fairfield,Ala. T2	10.20
Houston S5	10.45
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	*10.20*
Joliet,Ill. A7	10.20
KansasCity,Mo. S5	10.45
Kokomo,Ind. C16	10.30
LosAngeles B3	*11.00*
Minnequa,Colo. C10	10.45
Pittsburg,Calif. C11	11.00
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	*11.00*
SparrowsPt.,Md. B2	*10.30*
Sterling,Ill. (37) N15	10.20

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	.190
Atlanta A11	.192
Bartonville,Ill. K4	.192
Crawfordsville,Ind. M8	.192
Donora,Pa. A7	.196
Duluth A7	.196
Fairfield,Ala. T2	.196
Houston S5	.195
Jacksonville,Fla. M8	.197
Joliet,Ill. A7	.190
KansasCity,Mo. S5	.195
Kokomo,Ind. C16	.198
Minnequa,Colo. C10	.195
Pittsburg,Calif. C11	.220
S.Chicago,Ill. R2	.190
S.SanFrancisco C10	.214
Sterling,Ill. (7) N15	.196
SparrowsPt.,Md B2	*.198*
Tonawanda,N.Y. B12	.189
Williamsport,Pa. S19	.175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	.167
Franklin,Pa. F5	.167
Huntington,W.Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.167
Minnequa,Colo. C10	.172
Sterling,Ill.(1) N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.184††
Aliquippa,Pa. J5	.181‖
Atlanta A11	.190*
Bartonville,Ill. K4	.190
Crawfordsville,Ind. M8	.190
Donora,Pa. A7	.184†
Duluth A7	.184†
Fairfield,Ala. T2	.184†
Houston,Tex. S5	.189**
Jacksonville,Fla. M8	.195
Johnstown,Pa. B2	.188*
Joliet,Ill. A7	.184†
KansasCity,Mo. S5	.189**
Kokomo,Ind. C16	.186†
Minnequa,Colo. C10	.189**
Monessen,Pa. P7	.188*
Pittsburg,Calif. C11	.204†
Rankin,Pa. A7	.184†
S.Chicago,Ill. R2	.184**
S.SanFrancisco C10	.204**
SparrowsPoint,Md. B2	.190*
Sterling,Ill.(7) N15	.190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	.176**
Alig'ppa,Pa. 9-14½ga.	J5179‖
Atlanta A11	.182*
Bartonville,Ill. K4	.182
Crawfordsville,Ind. M8	.182
Donora,Pa. A7	.176†
Duluth A7	.176†
Fairfield,Ala. T2	.176†
Houston,Tex. S5	.181**
Jacksonville,Fla. M8	.187
Johnstown,Pa.(43) B2	.180*
Joliet,Ill. A7	.176†
KansasCity,Mo. S5	.181**
Kokomo,Ind. C16	.178†
Minnequa,Colo. C10	.181**
Monessen,Pa. 9 ga. P7	.180*
Pittsburg,Calif. C11	.199†
Rankin,Pa. A7	.176†
S.Chicago,Ill. R2	.176**
Sterling,Ill.(7) N15	.182*

	An'id Stone	Galv.
WIRE (16 gage)		
Ala.City,Ala.	R2 15.70	17.25**
Alig'ppa,Pa.	J5 ..15.70	17.50
Bartonville	K4 ..15.80	17.75
Buffalo	W12 ....16.10	....
Cleveland	A7 ....16.00	....
Crawf'dsville	M8 15.80	17.75
Fostoria,O.	S1 ..16.50	18.05†
Houston	S5 ...15.95	17.50**
Jacksonville	M8 ..16.05	18.00
Johnstown	*B2 ...16.00*	*17.95**
Kan.City,Mo.	S5 15.95	....
Kokomo	C16 ....16.10	17.65†
Minnequa	C10 ..16.25	17.80*
P'im'r,Mass.	W12 16.30	17.85†
Pitts.,Calif.	C11..16.35	17.90†
SparrowsPt.	*B2 16.10*	*18.05**
Sterling(37)	N15 16.00	17.95*
Waukegan	A7 ..16.00	17.55†
Worcester	A7 .16.30	....

WIRE, Merchant Quality (6 to 8 gage) An'id Galv.

Ala.City,Ala.	R2	7.95 8.35**
Aliquippa	J5	....7.95 8.475‖
Atlanta (48)	A11	8.05 8.65*
Bartonville(48)	K4	8.05 8.65
Buffalo	W12	.....8.20 8.75†
Cleveland	A7	....8.20 ....
Crawfordsville	M8	.8.05 8.65
Donora,Pa.	A7	..8.20 8.75†
Duluth	A7	.....8.20 8.75†
Fairfield	T2	.....8.20 8.75†
Houston(48)	S5	.8.45 9.00**
Jacks'ville,Fla.	M8	8.30 8.90
Johnstown	B2(48)	8.20 8.95*
Joliet,Ill.	A7	....8.20 8.75†
Kans.City(48)	S5	8.45 9.00**
Kokomo	C16	....8.30 8.85†
LosAngeles	*B3*	*....9.15 9.90**
Minnequa	C10	....8.45 9.00‡
Monessen	P7(48)	.7.95 8.55*
Palmer,Mass.	W12	8.50 9.05†
Pitts.,Calif.	C11	..9.15 9.70†
Rankin,Pa.	A7	...8.20 8.75†
S.Chicago	R2	...7.95 8.35**
S.SanFran.	*C10*	*..9.15 9.70**
Spar'wsPt.	B2(48)	8.30 9.05*
Sterling(37)	(48)N15	8.35 9.10
Struth'rs,O.	(48)Y1	7.95 8.45‡
Worcester,Mass.	A7	8.50 9.05†

Based on zinc price of: *13.50c. †5c. ‡10c. ††Less than 10c. †††3c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	52.5
Lower than 6 in.	43.5
⅝ in. thru 1 in:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1¼ in. and larger:	
All lengths	41.5

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	32.5

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.5
Longer than 6 in.	19.0
⅝ in. thru 1 in.:	
6 in. and shorter	16.0
Longer than 6 in.	16.0
1¼ in. and larger:	
All lengths	16.0

Lag Bolts
All diameters:

6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5

Blank Bolts 44.5
Step, Elevator, Tire Bolts 52.0

Stove Bolts, Slotted

⅛ to ⅛-in., incl., 3 in. and shorter	54.00
⅛ to ½-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:

All sizes	58.0

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	44.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	48.0
⅞ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller	61.5
¾ in. to 1-in., incl.	64.0
1⅛ in. to 1.5-in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SET SCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Cap Screws, Coarse or Fine Thread, Bright:
6 in. and shorter:

¼ in. and smaller	44.0
⅜, ⅞ and 1 in. diam.	27.0

Longer than 6 in.:

¼ in. and smaller	14.0
⅜, ⅞ and 1 in. diam.	6.5

High Carbon, Heat Treated:
6 in. and shorter:

¼ in. and smaller	31.0
⅜, ⅞ and 1 in. diam.	9.0

Longer than 6 in.:

¼ in. and smaller	+6
⅜, ⅞ and 1 in. diam.	+24

Flat Head Cap Screws:

¼ in. and smaller	+65.0

Set Screws, Square Head, Cup Point, Coarse Thread

Through 1 in. diam.:	
6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 11.50
7/8-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.58	22.84
1¼	13	....	29.07	22.68
1½	13	27.45	32.14	25.08
1⅝	13	32.43	37.97	29.64
2	13	36.34	42.56	33.21
2½	13	40.93	47.94	37.42
2¼	12	44.42	52.03	40.61
2½	12	48.94	57.31	44.73
2⅝	12	52.99	62.05	48.44
3	12	56.51	66.18	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	....
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	....
Johnstown,Pa. B2	....	....	....(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	6.275
Seattle B3	*6.425*
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.85
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	*14.35*

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2,Y1	9.225
KansasCity,Mo. S5	9.225
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	*9.725*
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.25c; 1 13/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.85c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.05c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 8.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+2.75	+20.75	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Benwood, W. Va. W10	6.5	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Youngstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.55

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	..		4.170
18.25	4.25	1	4.75	....		2.365
18	4	2	9	....		2.755
18	4	2	....	....		1.845
18	4	1	....	....		1.680
9	3.5	..	....	....		1.275
13.5	4	3	....	....		1.945
13.75	3.75	2	5	....		2.325
6.4	4.5	1.9	....	5		1.185
6	4	3	....	6		1.430
1.5	4	1	....	8.5		1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R3	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	73.79	76.29	76.79	....
Rochester,N.Y., deld.	67.52	68.02	68.52	....
Syracuse,N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago,Ill. Y1	64.50	65.00	65.00	....
S.Chicago,Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon,Mich., deld.	....	78.83	78.83	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	66.50	67.00	67.50	68.00
New York, deld.	....	73.20	73.70	....
Newark,N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland,Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&B sides), Aliquippa, deld.	....	66.45	66.45	66.95
McKeesRocks,Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	66.76	66.76	67.29
Verona,Trafford,Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge,Pa., deld.	67.10	67.60	67.60	68.13
Midland,Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	65.00	....
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield,O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie,Pa. I-3	64.50	65.00	65.00	65.50
Everett,Mass. E1	66.00	66.50	67.00	....
Fontana,Calif. K1	72.50	73.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity,Ill. G4	66.40	66.90	67.40	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	69.00‡	63.00	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extras; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.§	H.R. Alloy 4140††[3]		Carbon	Floor
Atlanta	8.17‖	9.37‖	9.83‖	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.06	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.60	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.80	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.55	11.09	12.41	....	9.70	9.75	10.54	18.89	9.60	9.50	11.15
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.70	9.65	10.99	....	8.80	9.15	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	10.80	11.65	57.45	9.15	9.05	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	8.70	....	7.78	8.36	....
New York	8.45	9.66	10.23	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.82	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	7.92	8.07	8.35	14.15	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	55.20	11.05‡‡	9.35	13.80	14.60	9.35	12.20‖	11.60
Richmond, Va.	8.00	....	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	73.36	8.19	8.43	8.96	14.51	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	9.21	....	8.94	8.90	9.87
San Francisco	9.05	10.40	10.90	53.45	9.05	9.15	12.55	15.60	9.15	9.30	11.55
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.70
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; ‖42 in. and under; **¼-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [6]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $156; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Pa., Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Pa., Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ¼-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$24.00-26.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-$1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	26.00
Annealed, 99.5% Fe	36.50
Unannealed (90+ % Fe)	34.00
Unannealed (90+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	35.80-45.00†
Bronze, 5000-lb lots	44.70-59.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	54.70-66.40†
Phosphor-Copper, 5000-lb lots	64.00
Copper (atomized) 5000-lb lots	46.50-54.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.08
Stainless Steel, 316	$1.44
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten: Dollars	
Melting grade, 99%	
40 to 2000 mesh:	
1000 lb and over	*4.00*
Less than 1000 lb	*4.15*
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.50	7.50	7.50	7.75
Channels	7.70	7.70	7.70	7.95
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.90	6.90	6.90	7.35
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.57

Oil Country Pipe: Mills withdrawn temporarily.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

AMERICAN SCREW COMPANY
Willimantic, Connecticut
THE BLAKE & JOHNSON CO.
Waterville 14, Connecticut
BUTCHER & HART MFG. CO.
Altoona, Pennsylvania
CANADA ILLINOIS TOOLS LTD.
Toronto, Ont., Canada
CENTRAL SCREW COMPANY
Chicago 9, Illinois
Keene, New Hampshire
CLEVELAND CAP SCREW CO.
Cleveland 4, Ohio
CONNECTICUT SCREW & RIVET CO., INC.
Waterbury 20, Connecticut
CONTINENTAL SCREW CO.
New Bedford, Massachusetts
ECONOMY SCREW CORP.
Chicago 14, Illinois
ELCO TOOL & SCREW CORPORATION
Rockford, Illinois
FEDERAL SCREW WORKS
Detroit 10, Michigan
GREAT LAKES SCREW CORPORATION
Chicago 27, Illinois
H. M. HARPER CO.
Morton Grove, Illinois
HARVEY HUBBELL, INC.
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Massillon, Ohio
London, Ontario
REPUBLIC STEEL CORP.
Bolt & Nut Division, Cleveland 13, Ohio
RING SCREW WORKS
Van Dyke, Michigan
P. L. ROBERTSON MFG. CO., LTD.
Milton, Ont., Canada
ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois
RUSSELL, BURDSALL & WARD BOLT & NUT CO.
Port Chester, New York
Los Angeles 33, California
Rock Falls, Illinois
SCOVILL MANUFACTURING CO.
Waterville Division, Waterville 48, Connecticut
SEMS DIVISION, TEXTRON INC.
Rockford, Illinois
SHAKEPROOF DIVISION, ILLINOIS TOOL WORKS
Elgin, Illinois
SOUTHINGTON HARDWARE MFG. CO.
Southington, Connecticut
STEEL CO. OF CANADA, LTD.
Hamilton, Ont., Canada
THOMPSON-BREMER & CO.
Chicago 22, Illinois
TRIPLEX SCREW CO.
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Chicago 8, Illinois
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39 Sources

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Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $225, Johnstown, Duquesne, Sheridan, Pa., Alloy W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Grade Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk, 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l. pallets 16.2c; 2000 lb to c.l. bags, 17.2c, less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ¼ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet, packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $5.10 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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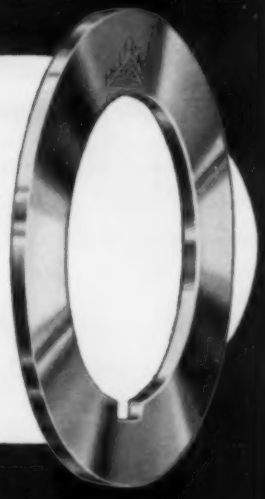

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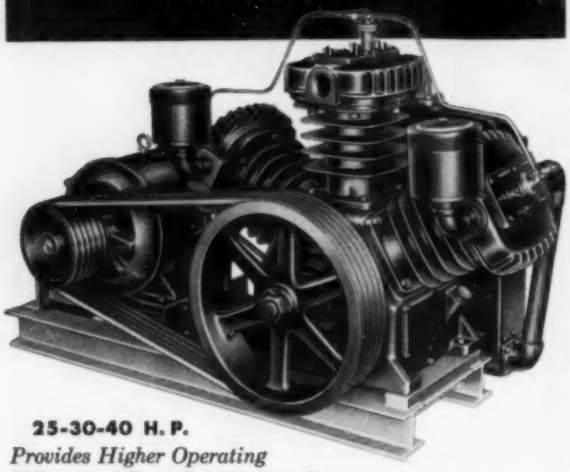

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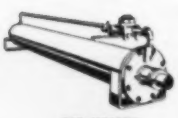

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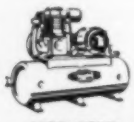

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Mill Interest in Scrap Still Lags

Absence of active demand continues to depress prices and the composite on the steelmaking grades declines to $44. End of slump is not yet sighted

Scrap Prices, Page 200

Pittsburgh—A major independent mill bought No. 2 heavy melting scrap at $35 last week, for delivery to a Pittsburgh plant. No. 1 heavy melting can be purchased at $43. This marks a $1 drop in the past week. No. 2 bundles are the weakest of major scrap grades. It declined $2 a ton. Stainless steel scrap continues to slip. Purchasers of 18-8 bundles and solids are paying no more than $350 a ton.

Philadelphia — Railroad scrap lists brought slightly lower prices this month, and other prime steel scrap grades are lower by $1.50 to $2 a ton. The decline is less precipitous. Mill buying is light but volume taken in by the yards is smaller. Export activity is up, three boats scheduled for loading this month. The tonnage for these was covered at prices slightly above current quotations.

New York—Prices continue to sag, but declines are not as sharp, averaging $1 a ton on the steel grades. Heavy breakable cast is also down $1. New buying and shipments are light. Steel mill scrap supplies are in good shape as operating rates slowly slide off. For delivery at dock for export, more tonnage is moving at slightly higher prices than prevail on domestic orders.

Chicago—A slightly declining steelmaking rate appears to be pacing the scrap market to lower levels. Price declines the past week range from $1 on No. 2 heavy melting, No. 1 factory bundles, No. 1 dealer bundles, No. 2 bundles, and rerolling rails, to $3 on blast furnace grades.

Consumer purchases have been light, which raises speculation as to what influence substantial acquisitions might have on prices. Almost no one believes the bottom has been reached.

Cleveland—The market is devoid of new sales with steel mill operations tending downward. Mill inventories of scrap are considered adequate. The percentage of hot metal in open-hearth furnace melts is rising. At the same time home scrap consumption is up. This means less dependence on dealer scrap. The market continues weak, but prices are unchanged and largely nominal.

Youngstown—Further price decline is noted here. One small sale of industrial No. 1 heavy melting is reported at $46. Dealer scrap prices are down $22 to $23 below the levels that prevailed at the end of last year.

Buffalo—Consumer buying prices are down $5 to $7 a ton here. New contracts for April delivery have been placed and No. 1 heavy melting now is quoted at $42, compared with the March price of $49. No. 2 heavy melting has sold at $38, and No. 2 bundles at $35, both off $5 from the March levels. The blast furnace grades are off also.

Detroit—Scrap prices continue to decline here. Dealers see no immediate relief, but they feel the decline will be orderly. The soft market finally brought a drop in the cast iron grades. Malleable is the only foundry item still holding up.

Cincinnati—Prices appear to be stabilizing after a series of deep cuts. The trade feels the bottom of the decline has been reached with No. 1 heavy melting $37-$38, brokers' buying price. A local mill purchased substantial tonnage the past week.

St. Louis—Extremely slow demand has forced cast scrap prices down. Brokers report few transactions, and those for small tonnages. Mills' ground stocks are substantial.

Birmingham — Exporters returned to the market last week, offering lower prices which the dealers were ready to accept. An Atlanta mill also returned to the market for No. 2 heavy melting steel at $37, delivered.

Seattle — The scrap market dropped $2 to $3 last week, and further declines are expected. Both the domestic and foreign sections are bearish. Larger consumers hold substantial inventories. Japan appears to be short of exchange to finance new scrap purchases.

In the last month a full scrap cargo from Suva and other South Pacific ports to Japan was closed at $266,000 freight for a 10,000-ton ship. Another from Antwerp to Japan was at $26 a ton, free load and discharge.

Los Angeles—Prices are steady, except for a $2 drop to $34 on machine shop turnings. The small mills are out of the market, but activity is sustained by the larger mills' purchases.

San Francisco—The undertone of the steel scrap market here is weak. Despite a recent decline of $4 per ton, prices are expected to sink still further.

STRUCTURAL SHAPES . . .

(*Concluded from page 186*)

STRUCTURAL STEEL PENDING

325 tons, state highway bridge FAR-57-9, Onondaga county, New York; bids Apr. 25, Albany, N.Y.

305 tons, state highway bridge, FAS8-57-5, Dutchess county, New York; bids Apr. 25, Albany, N.Y.

235 tons, bridge, 21st street, over Reading railroad, Philadelphia; bids Apr. 18.

200 tons or more, highway bridge, Noxon Rapids, Mont., $720,000 power project to the Hansen & Parr Construction Co., Spokane, Wash., by the Washington Water Power Co., Spokane.

REINFORCING BARS . . .

REINFORCING BARS PLACED

440 tons, early warning installations, Barichef and Cold Bay, Alaska, to the Bethlehem Pacific Coast Steel Corp., Seattle.

200 tons, Military installation, Alaska, to the Bethlehem Pacific Coast Steel Corp., Seattle; Manson-Osberg Co., Seattle, general contractor.

130 tons, bars and structurals, laboratory test cells, United Aircraft Corp., East Hartford, Conn., to the Bethlehem Steel Co., Bethlehem, Pa. (bars); Standard Structural Steel Co., Hartford Conn. (structurals); Standard Builders Inc., Hartford, general contractor.

100 tons, bars and structurals, school, Malden, Mass., to Joseph T. Ryerson & Sons Inc., Boston (bars); Boston Steel Fabricators, Boston (structurals); L. & R. Construction Co., Medford, Mass., general contractor.

REINFORCING BARS PENDING

400 tons, 5.09 miles of Tri-State route, Northern Illinois toll highway, including erection of precast concrete bridges, Newport township, Lake county, Ill., for Illinois State Toll Highway Commission, Chicago; bids Apr. 25.

325 tons, Hungry Hill bridge, Rhode Island; bids in.

205 tons, Washington state highway bridges, Kittitas and Snohomish counties; bids to Olympia, Wash., Apr. 23.

105 tons, bridge and culverts, Litchfield-Morris-Washington, Conn.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Apr. 10, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apr. 10	$44.00
Apr. 3	45.00
Mar. Avg.	49.63
Apr. 1956	54.90
Apr. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*42.00-43.00*
Machine shop turnings	*29.00-30.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*33.00-34.00*
Cut structurals, 3 ft. lengths	*47.00-48.00*
Cut structurals, 2 ft. and under	*49.00-50.00*
Heavy turnings	*37.00-38.00*
Punchings & plate scrap	*47.00-48.00*
Electric furnace bundles	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	42.00-43.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt	*45.00-46.00*
Rails, 2 ft and under	*64.00-65.00*
Rails, 18 in. and under	*65.00-66.00*
Rails, random lengths	*61.00-62.00*
Railroad specialties	*62.00-63.00*

Stainless Steel Scrap

18-8 bundles & solids	*330.00-350.00*
18-8 turnings	*240.00-250.00*
430 bundles & solids	*85.00-90.00*
430 turnings	*60.00-65.00*

CLEVELAND

No. 1 heavy melting	36.50-37.50
No. 1 factory bundles	42.00-43.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	36.50-37.50
No. 2 bundles	30.00-31.00
No. 1 busheling	36.50-37.50
Machine shop turnings	22.00-23.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut foundry steel	43.00-44.00
Cut structurals, plates 2 ft and under	49.00-50.00
Low phos. punchings & plate	37.50-38.50
Alloy free, short shovel turnings	29.00-30.00
Electric furnace bundles	37.50-38.50

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	37.00-38.00
Heavy breakable cast	37.00-38.00
Stove plate	44.00-45.00
Unstripped motor blocks	30.00-31.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	35.00-36.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	61.00-62.00
Cast steel	55.00-56.00
Railroad specialties	59.00-60.00
Uncut tires	58.00-59.00
Angles, splice bars	59.00-60.00
Rails, rerolling	67.00-68.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	320.00-330.00
18-8 turnings	220.00-230.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	35.50-36.50
No. 1 bundles	39.00-40.00
No. 2 bundles	33.00-34.00
No. 1 busheling	39.00-40.00
Machine shop turnings	22.00-23.00
Short shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	40.00-41.00
Electric furnace bundles	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00

CHICAGO

No. 1 hvy melt, indus.	42.00-43.00
No. 1 hvy melt, dealer	*39.00-40.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 factory bundles	*45.00-46.00*
No. 1 dealer bundles	*41.00-42.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling, indus.	42.00-43.00
No. 1 busheling, dealer	*39.00-40.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*25.00-26.00*
Short shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Cut structurals, 3 ft	47.00-48.00
Punchings & plate scrap	48.00-49.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Angles, splice bars	*53.00-54.00*
Rails, rerolling	*54.00-55.00*

Stainless Steel Scrap

18-8 bundles & solids	330.00-340.00
18-8 turnings	230.00-240.00
430 bundles & solids	85.00-90.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	*24.00-25.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*33.00-34.00*
Machine shop turnings	*22.00-23.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*23.00-24.00*
Punchings & plate scrap	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	*46.00*
Charging box cast	*41.00*
Stove plate	*43.00*
Heavy breakable	*39.00*
Unstripped motor blocks	*26.00*
Clean auto cast	*51.00*
Malleable	53.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*39.50*
No. 2 heavy melting	*37.00*
No. 1 bundles	*39.50*
No. 2 bundles	*32.00*
No. 1 busheling	*39.50*
Machine shop turnings	*24.00*
Short shovel turnings	*29.00*

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	*35.00*
Heavy brakable cast	*35.00*
Unstripped motor blocks	*35.00*
Brake shoes	40.00
Clean auto cast	*48.00*
Stove plate	*39.00*

Railroad Scrap

No. 1 R.R. heavy melt.	46.50
Rails, 18 in. and under	*59.00*
Rails, rerolling	*58.00*
Rails, random lengths	*51.00*
Angles, splice bars	*53.00*

PHILADELPHIA

No. 1 heavy melting	*48.50*
No. 2 heavy melting	*39.00*
No. 1 bundles	*48.50*
No. 2 bundles	*37.00*
No. 1 busheling	*48.50*
Electric furnace bundles	*51.00*
Mixed borings, turnings	*35.00*
Short shovel turnings	*36.00-37.00*
Machine shop turnings	*33.00-34.00*
Heavy turnings	*44.50*
Structurals & plate	*53.00*
Couplers, springs, wheels	*59.00-60.00*
Rail crops, 2 ft & under	*67.00*

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Heavy breakable cast	*55.00-56.00*
Malleable	62.00
Drop broken machinery	55.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*30.00-31.00*
Machine shop turnings	*22.00-23.00*
Mixed borings, turnings	*24.00-25.00*
Short shovel turnings	*27.00-28.00*
Low phos. (structurals & plate	46.00-47.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Unstripped motor blocks	*31.00-32.00*
Heavy breakable	*45.00-46.00*

Stainless Steel

18-8 sheets, clips solids	360.00-370.00
18-8 borings, turnings	260.00
430 sheets, clips, solids	80.00-90.00
410 sheets, clips, solids	70.00-80.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*36.50-37.00*
No. 2 heavy melting	*30.50-31.00*
No. 1 bundles	*37.00-37.50*
No. 2 bundles	*28.50-29.00*
No. 1 busheling	*36.50-37.00*
Machine shop turnings	*20.50-21.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*24.00-25.00*
No. 1 cast	38.00-39.00
Mixed cupola cast	36.00-37.00
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	37.00-38.00
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*41.00-42.00*
Mixed borings, turnings	*29.00-30.00*
Machine shop turnings	*27.00-28.00*
Short shovel turnings	*30.00-31.00*
Cast iron borings	*29.00-30.00*
Low phos.	*45.00-46.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.00-44.00
No. 1 machinery	47.00-48.00

Railroad Scrap

Rails, random lengths	53.00-54.00
Rails, 3 ft and under	*59.00-60.00*
Railroad specialties	*47.00-48.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	37.00-38.00
No. 2 bundles	*28.00-29.00*
No. 1 busheling	37.00-38.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	27.00-28.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-44.00
Heavy breakable cast	43.00-44.00
Charging box cast	43.00-44.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18 in. and under	64.00-65.00
Rails, random lengths	54.00-55.00

BIRMINGHAM

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	40.00-41.00
No. 2 bundles	24.00-25.00
No. 1 busheling	40.00-41.00
Cast iron borings	26.00-27.00
Short shovel turnings	*29.00-30.00*
Machine shop turnings	*27.00-28.00*
Bar crops and plate	*46.00-47.00*
Structurals & plate	*45.00-46.00*
Electric furnace bundles	*43.00-44.00*
Electric furnace, 2 ft & under	*41.00-42.00*

(F.o.b. shipping point)

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	47.00-48.00
Unstripped motor blocks	38.00-39.00
Charging box cast	37.00-38.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	*42.00-43.00*
Rails, 18 in. and under	53.00-54.00
Rails, rerolling	59.00-60.00
Rails, random lengths	49.00-50.00
Angles, splice bars	52.00-53.00

SEATTLE

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*46.00*
No. 1 bundles	*46.00*
No. 2 bundles	*30.00*
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	*62.00*

Cast Iron Grades

No. 1 cupola	*50.00*
Heavy breakable cast	*48.00*
Unstripped motor blocks	*40.00*
HStove plate (f.o.b. plant	42.00

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	51.00
No. 1 bundles	54.00
No. 2 bundles	*34.00*
Machine shop turnings	36.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	51.00
No. 2 heavy melting	46.00
No. 1 bundles	50.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	57.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	57.00
No. 1 wheels	50.00
Drop broken machinery	57.00

HAMILTON, ONT.

No. 1 heavy melting	*43.00*
No. 2 heavy melting	*38.00*
No. 1 bundles	*43.00*
No. 2 bundles	*32.00*
Mixed steel scrap	*35.00*
Mixed borings, turnings	*19.00*
Prepared	*43.00*
Unprepared	*37.00*
Short steel turnings	*30.00*
Rails, rerolling	*49.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

for complete service
and coverage of

STAINLESS and ALLOY STEEL SCRAP

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Spring Brings Improvement

There is no avalanche of new business but nonferrous markets are firmer. Lead, zinc and copper sales are up slightly. Gradual second quarter buildup is anticipated

Nonferrous Metal Prices, Pages 204 & 205

ZINC production and shipments are paralleling those of last year.

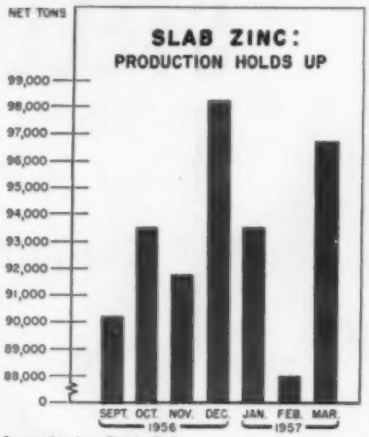
Last month, 96,715 tons of slab zinc were produced domestically, the American Zinc Institute, New York, reports. Average monthly production during the first quarter was 92,748 tons. This compares with the 1956 monthly production average of 88,580 tons. While the first quarter monthly domestic shipment average (67,367 tons) dipped below last year's (72,439 tons), the government has made up most of the difference with its stockpile purchases to bring the first quarter monthly total shipment average within 434 tons of 1956 monthly average.

U.S. Take—In March, the government contracted for 25,608 tons of zinc. For the first time, part of the amount was for stockpile, part was taken in under barter provisions. American producers who process foreign origin ores can qualify to sell the government these ores as foreign excesses as well as offer processed domestic ores for supplementary stockpile. "Government account" totals have been used as an estimate of stockpile deliveries up to this time. Industry observers guesstimate that no more than 10,000 tons were contracted for by General Services Administration in March for domestic stockpile.

Outlook: Zinc sales are showing some improvement. April deliveries are outstripping March shipments. Says one sales manager: "Everything is up a bit, but no one is pounding our doors down."

Mag Inquiries Up

D. T. Wellman, president, the Magnesium Association and Wellman Bronze & Aluminum Co., told STEEL recently: "During the past year we have seen an increase in the number of requests for quotations. They are coming from firms which are currently using magnesium and want to convert additional components to magnesium as well as from companies who are exploring the possibility of using mag for the first time. Though only about 15 per cent of the industry's business is for commercial uses, we are confident that new applications will continue to grow as a result of the intensified interest and experimentation."



Source: American Zinc Institute.

Barometer: February shipments of magnesium wrought products (1261 tons) were one third greater than February, 1956, shipments and 18 per cent ahead of January's total (1065 tons).

Titanium Gets Competitive

Look for about 5000 tons of titanium mill products to be shipped during the first half. This will be almost equal to last year's total mill shipments (about 5300 tons). But major fabricators are not smiling too broadly. Reason: The bidding for government contracts is getting intensively competitive. As major metal companies have turned their attention to the production of titanium sponge, ingot and mill products, titanium producers are getting set for intensive competition. Outlook: Mill product shipments could reach 11,500 tons during 1957, but profit margins may shrink as competition grows.

Brass Mill Picture Brightens

"Everyone has worn himself out with conservatism," reports a brass mill executive. "Now they have no choice but to buy." While there is no marked improvement, most brass mills report there is a slight uptrend and that the market undertone is firmer than it has been for several months.

Stability appears to be returning to the copper market. Primary producers are holding at the 32 cent level. A series of small strikes in Northern Rhodesian copper mines have had little effect on the market. Outlook: There should be a gradual buildup during the entire second quarter.

NONFERROUS PRICE RECORD

	Price Apr. 10	Last Change	Previous Price	Mar. Avg.	Feb. Avg.	Apr., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.650
Copper	31.50-32.00	Apr. 3, 1957	32.00	31.462	32.863	47.500
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.150
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	98.875	Apr. 9, 1957	99.25	99.683	101.159	99.270
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

NEW!

KENNAMATIC TOOL

incorporates Kendex* Chip control features

- **provides uniform chip control**
- **eliminates chipbreaker grinding**
- **allows you to use up short inserts**

This new tool utilizes the simple, effective and economical Kendex chip control system while retaining the best of the time-tested Kennamatic tool features.

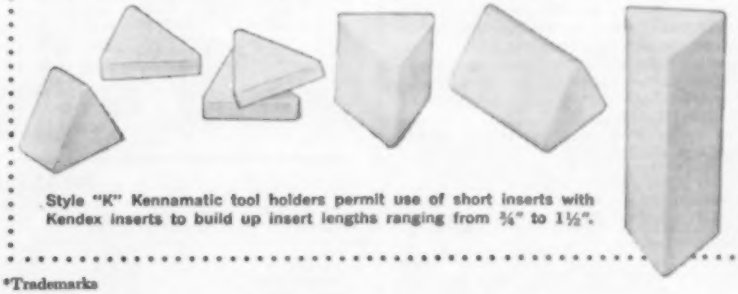
It has the Kendex top structure with its clamped Kennametal* chipbreaker plate. This provides uniform chip control over a wide range of feeds and depths of cut. It also eliminates costly grinding of chipbreakers.

A milled shoulder or ledge on the top of the holder is located adjacent to the cutting edge. This serves as a "height gage" for accurate and fast relocation of the insert cutting point on center line of workpiece. Machine downtime for insert changing is thus held to a minimum.

The broached insert pocket and back-up screw, which has a ¾" adjustment, makes it possible to use any combination of inserts to form a total insert length ranging from ¾" to 1½". Short inserts may be stacked or combined with Kendex inserts. This permits use of more of the original insert, and simplifies insert inventories if you are converting from long inserts to "throw-aways."

Style "K" Kennamatic tool holders are available from stock in 7 styles and a wide range of shank sizes, plus a full complement of Kennamatic inserts, for a wide variety of machining operations.

Your Kennametal tool engineer will gladly demonstrate the new Kennamatic Tool. Call him or write to KENNAMETAL INC., Latrobe, Pa.



Style "K" Kennamatic tool holders permit use of short inserts with Kendex inserts to build up insert lengths ranging from ¾" to 1½".

*Trademarks

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.50 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.
Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.
Osmium: $50-$100 per troy oz, nom.
Palladium: $23-$24 per troy oz.
Platinum: $92-$95 per troy oz from refineries.
Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 98.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.75; grade A-2 (0.5% Fe max.), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00 deld.
Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-28.75; No. 12 foundry alloy (No. 2 grade), 21.50-22.50; 5% silicon alloy, 0.60 Cu max., 24.25-25.00; 13 alloy, 0.60 Cu max., 24.25-25.00; 195 alloy, 24.00-25.25; 108 alloy, 22.00-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 21.50; grade 3, 20.50; grade 4, 19.75.
Brass Ingot: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.50; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.25; manganese bronze, No. 421, 28.50.
Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-56.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.8	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.66	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.50-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 9.00-9.50; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	37.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.08	51.08	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcases, 9.00-9.50; industrial castings, 9.00-9.50.

Copper and Brass: No. 1 heavy copper and wire, 24.00-24.50; No. 2 heavy copper and wire, 22.50-23.00; light copper, 20.50-21.00; No. 1 composition red brass, 20.50-21.00; No. 1 composition turnings, 19.50-20.00; yellow brass turnings, 12.00-12.25; new brass clippings, 18.50-19.00; light brass, 12.00-12.50; heavy yellow brass, 14.50-14.75; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.25-15.75; cocks and faucets, 16.25-16.75; brass pipe, 16.50-17.00.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 60.00-75.00; old sheets, 60.00-70.00; turnings, 50.00-60.00; rods, 60.00-75.00.

Nickel: Sheets and clips, 100.00-165.00; rolled anodes, 100.00-165.00; turnings, 80.00-140.00; rod ends, 100.00-165.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00-17.50; 3003 clippings, 17.00-17.50; 6151 clippings, 17.00-17.50; 5052 clippings, 17.00; 2014 clippings, 16.00-17.00; 2017 clippings, 16.00-17.00; 2024 clippings, 16.00-17.00; mixed clippings, 16.00; old sheets, 14.00; old cast, 14.00; clean old cable (free of steel), 16.50-17.00; borings and turnings, 14.50-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.50; light copper, 23.25; refinery brass (60% copper) per dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.50; light copper, 23.25; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 17.50; yellow brass turnings, 16.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

WANTED IMMEDIATELY

First class Structural Engineer wanted for large fabricating plant in the Southwest, fabricating steel for mill and tier buildings and all types of highway, turnpike and expressway projects.

Applicant should be about 35-40 years old with about 15 years experience in detail drafting office. Requirements of college graduate or registered engineer are not essential provided applicant has sufficient education and experience to qualify as a registered engineer.

Excellent opportunity for advancement—Ideal working conditions in air-conditioned office—Company benefits—Insurance—Hospitalization — Vacation — Retirement — Paid Holidays and Sick Leave.

Enclose complete resume of personal history, education and experience.

Box 535, STEEL

Penton Bldg. Cleveland 13, Ohio

POSITION WANTED

Attorney now associated with the U. S. Government in Washington on procurement work for the Armed Services desires position in private industry.

Present work includes solicitation of bids and proposals, awarding of contracts, preparation of contract clauses and forms, contract administration, foreign purchases, handling of government property, termination of contracts and developing standard purchasing policies. This work involves many contacts with personnel in all military establishments.

In addition to several years in Washington, experience includes contract negotiation and rendering of legal advice on contracting at Wright-Patterson Air Force Base in Dayton, O.

While attending law school in Washington, performed legal research work for law firm with many clients in the metalworking field.

Would prefer to remain in Washington representing company or association interested in improving its business and relations with the government.

Will be glad to provide additional information in confidence by mail or arrange an interview at your convenience.

Write Box 545, STEEL

Penton Bldg. **Cleveland 13, Ohio**

INDUSTRIAL ENGINEER

Progressive Company engaged in basic process and pyrometallurgy offers unusual opportunity for industrial engineer, preferably having experience in steel or other heavy industry. Must be capable of establishing and administering job evaluation program. Experience in time and motion study as well as material handling desirable. Location northeast section of United States. Position will require some travel to midwest and southern plants. All replies held strictly confidential. Submit detailed resume covering educational background, experience and salary requirements to Box 534, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR SALE

COMPLETE BAR & ROD ROLLING MILL IMMEDIATELY AVAILABLE

Suitable for Rolling Steel or Copper billets down to bar or rod sizes, including hotbeds, shears, & rod coiler.

STILL SET-UP, REASONABLY PRICED FOR IMMEDIATE SALE

National Machinery Exchange

126 Mott St., New York

CAnal 6-2470

ARE YOU REPRESENTED IN FLORIDA?

Graduate engineer with well organized sales office in Tampa area would like to represent one additional industrial account in the State of Florida. Present contacts are with O. E. M. accounts and industrial distributors. Will handle your account on commission or retainer basis. **Box No. 541, STEEL, Penton Bldg., Cleveland 13, Ohio.**

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STRUCTURAL ENGINEER

Wanted for structural steel fabricating plant in Philadelphia. Applicant should have experience in estimating, detailing, etc. Requirements of college graduate engineer are not essential provided applicant has sufficient education and practical experience. Good position & excellent opportunity for advancement. Enclose complete resume of personal history, photo (returnable), education and experience.

ADDRESS BOX 543, STEEL

Penton Bldg. **Cleveland 13, Ohio**

2000 Ton Hydraulic Press, Watson-Stillman 60" side to side, 46" F to B, 36" Daylight, 18" stroke, 36" diameter ram for 4000 PSI, complete with self-contained hydraulic system. Modern late model, excellent condition. Bargain Priced.

Bedford-Bolling Company, Inc.
Michigan 1-2850
3190 East 65th Street Cleveland 27, Ohio

WANTED:—Discs or "drop-outs" low carbon steel in 4" and 6" diameters x $\frac{1}{4}$" thick; 8", 10" and 12" diameters x $\frac{1}{8}$" thick. Quote best price delivered in Cleveland, Ohio; quantity available of each size. Reply Box 525, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED

Help Wanted

SUPERVISOR WANTED BY MERCHANT BAR Rolling Mill for Finishing and Shipping Department. Small community, location Western Pennsylvania. Experience preferred in Shearing, Straightening, Reinforcing Bar Fabrication and Shipping procedures. Submit full resume of personal history and work experience. Reply to Box 544, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

FACTORY MGR. (MFG. ENG.)—STAMPINGS. Related operations, machining, excelling in scheduling, tooling, tool design, product design and composite experience, progressive, deep draws, welding. Prefer medium size firm with good potential. Interested in five figure salary. Age 46, sober, highest integrity. Write Box 542, STEEL, Penton Bldg., Cleveland 13, Ohio.

WANTED

Repair parts for Erie 1500 lb. Board Drop Hammer, parts needed, Anvils, upright columns. Year from 1925 to 1939.

Also require 2 Drop Hammers Board 1500 lb. to 2000 lb.

THE KEN-TOOL MFG. CO.
Akron 5, Ohio

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for all types of
HYDRAULIC EQUIPMENT

Hyde Park Rams are available in Chilled or Alloy Iron.

Furnished in hardness range to meet your specification... ground to your required size.

On your next replacement of Rams — or for new equipment—consult us. Our engineers will be glad to assist you.

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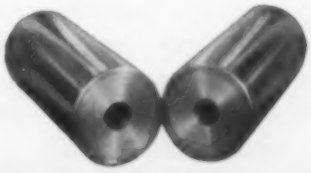
Gray Iron Castings up to 80,000 lb.



Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland Co., Pa.
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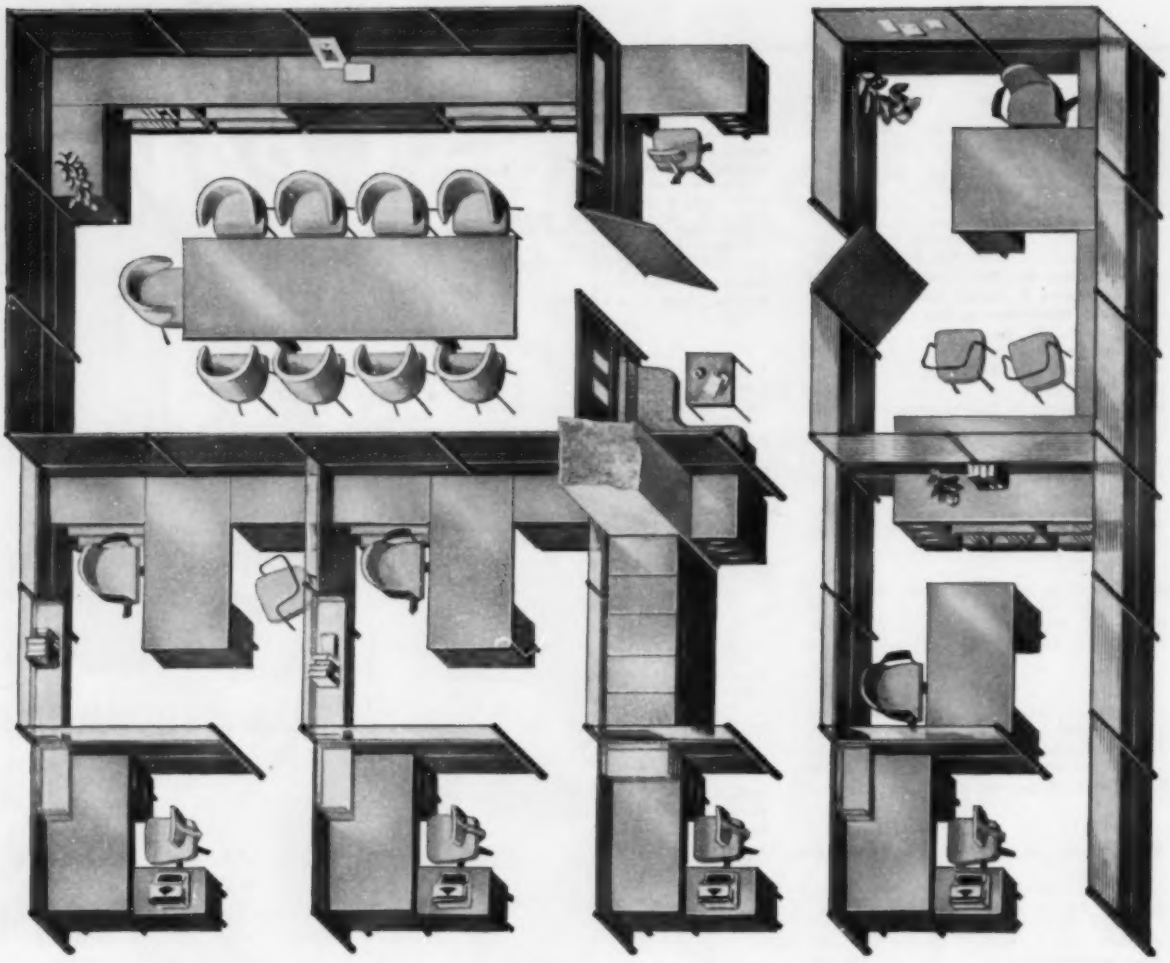
ROLLING MILL MACHINERY
GREY IRON CASTINGS



All this in 800 sq ft—with sheet steel

Here, efficiently fitted into a 31 ft by 26 ft space, are individual quarters for an executive and secretary, three supervisors, three stenographers, a file clerk and file room, plus a reception area and spacious conference room! And the whole set-up can easily and quickly be shifted around to meet the changing needs of the tenant.

Such compact and comfortable use of space is possible through the amazing versatility of free-standing sheet-steel partitioning, along with sheet-steel desks and furniture components. And the idea is catching fire: at least one new building has each story planned as one big interior, to be partitioned according to the needs of each individual tenant.

Here is an application that requires thousands of tons of Bethlehem hot-rolled and cold-rolled sheets every year. The actual tonnage figure is growing, too, just as it is for such other latter-day items as room air-conditioners, vending machines, steel fireplaces, TV cabinets and power lawn-mowers—all of them end uses for which our mills at Sparrows Point and Lackawanna are furnishing substantial quantities of hot- and cold-rolled sheets and strip.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Millroom in Atlantic Steel's new plant. In the right foreground you see the Cleveland unit which serves as Kick-off Drive on the Shear Discharge Table.

8 CLEVELAND drives equip new DIXISTEEL bar mill

TRADE MARK

ONE of the finest, fastest, most versatile of the recent additions to America's steel processing facilities is a new 13" merchant bar and rod mill at Atlanta, Georgia. In operation since last November, this mill produces rods, rounds, flats, angles, channels and light sections of various sizes under the well-known name of Dixisteel, trademark of the Atlantic Steel Company.

Power transmission equipment includes another famous name product—Cleveland Worm Gear Speed Reducers —of which 8 heavy-duty units are employed as drives on the mill discharge table and cooling bed carry-over.

Whenever drives must handle heavy loads under difficult conditions—efficiently, economically, continuously, dependably—industry chooses Clevelands. There are models to meet every requirement, wherever a powerful right-angle drive is preferred. To see the complete line, write for a copy of Bulletin 145—just off press.

The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.

CLEVELAND
Worm Gear
Speed Reducers

Choice of the Leaders

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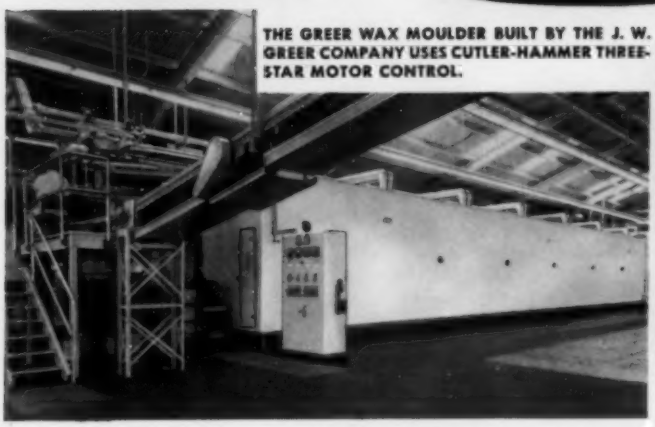
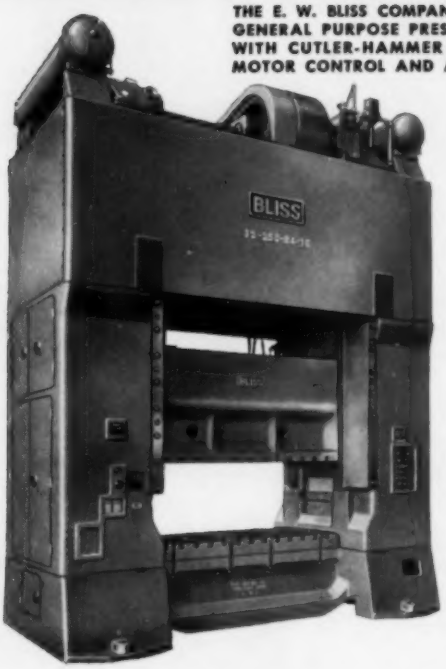


THE GREER WAX MOULDER BUILT BY THE J. W. GREER COMPANY USES CUTLER-HAMMER THREE-STAR MOTOR CONTROL.

THE DRK CENTRAL STATION AIR CONDITIONING UNIT BUILT BY THE UNITED STATES AIR CONDITIONING CORP. USES CUTLER-HAMMER THREE-STAR MOTOR CONTROL.



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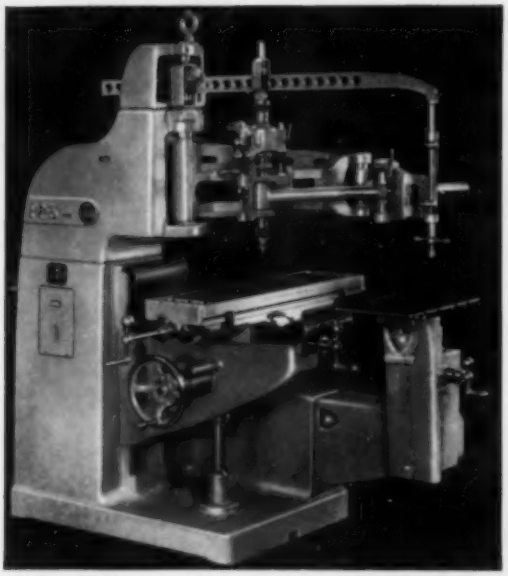

THE GORTON P2-3 THREE DIMENSIONAL PANTOGRAPH AND DIE MAKING MACHINE BUILT BY THE GEORGE GORTON MACHINE COMPANY. EQUIPPED WITH CUTLER-HAMMER THREE-STAR MOTOR CONTROL AND HEAVY DUTY OIL-TIGHT PUSHBUTTONS.

The Stars Are Everywhere

Throughout industry there are those machinery builders whose products are widely recognized as superior. Everywhere their machines have withstood the test of direct competitive comparison. Consistently they have demonstrated a superiority of performance and dependability not matched by others. Such enviable leadership is never accidental. It invariably results from an uncompromising program of product improvement and a jealous concern for every detail that influences performance.

In recent years, more and more leading builders of all types of machines have adopted Cutler-Hammer Three-Star Motor Control as their standard original control equipment. The stars are *everywhere*. So marked a trend cannot be ignored. Any machinery buyer will find Cutler-Hammer Three-Star Motor Control a reliable guide to greater value and satisfaction. Now more than ever before, Cutler-Hammer is the choice of the Leaders . . . the mark of better machines. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ontario, Canada.